OLIVETTI PRINTERS
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DM 100-S / DM 105-S

olivetti

user manual

DM 100-S / DM 105-S
dot matrix printer

Publication N° 72999103 X

7299910300

INGLESE LIG 003

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Publication issued by:
Ing. C. Olivetti & C., S.p.A.
Direzione Documentazione
77, Via Jervis - 10015 IVREA (Italy)

With the right to vary the technical specifications

Printed in Italy

This equipment conforms to the specifications of the ECC Directive 87/308 on the prevention and elimination of radio-frequency disturbances

This equipment has been tested and found to comply with the limits for a CLASS B digital device pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment to an outlet of a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for assistance.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Connecting of peripherals requires the use of grounded shielded signal cables.

EMI REQUIREMENTS FOR CANADIAN MARKET

This digital apparatus does not exceed the CLASS B limits for radio noise emissions from digital apparatus as set out in the Radio Interference Regulations of the CANADIAN DEPARTMENT OF COMMUNICATIONS.

This digital equipment does not exceed the Class B limits for radio frequency noise from digital apparatus set out in the Radio Interference Regulation of the CANADIAN DEPARTMENT OF COMMUNICATION if used according with the Manufacturer Instruction.

Ce dispositif digital, s'il est utilisé suivant les instructions et recommandations du constructeur, ne dépasse pas les limites de la Classe A pour le bruit des fréquences radio, établies par les Règles sur l'interference radio du Ministère Canadien des Communications.

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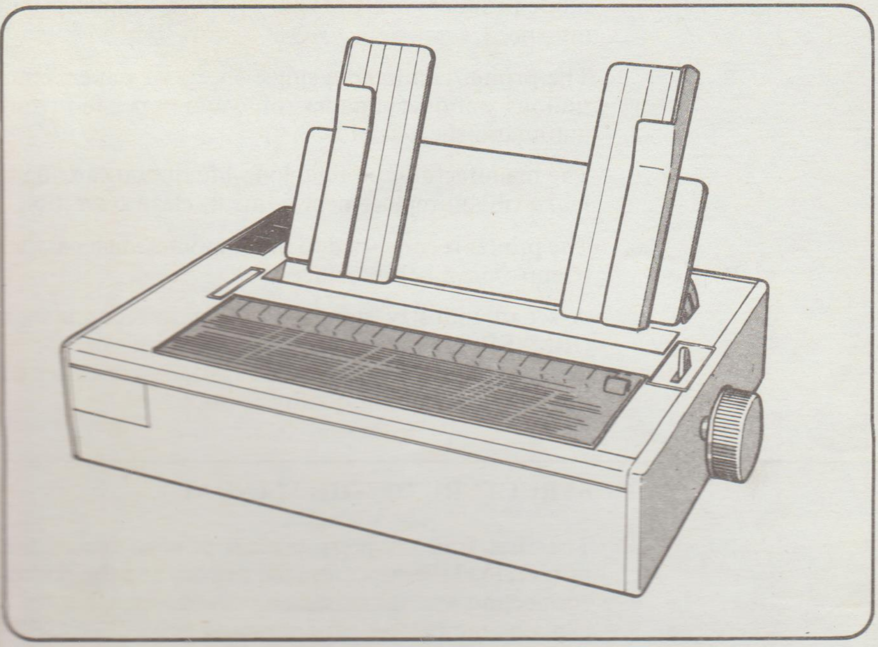


This manual describes a compact, light-weight, desk top dot matrix printer, which is available in two models: standard and with a colour feature.

The printer has a maximum operating speed of 200 characters per second (cps) with bi-directional, optimised print head movement. It has a choice of printing styles (Near Letter Quality (NLQ), Draft and High Speed Draft (HSD) and print pitches, and can print boldface, underscored and enlarged characters, subscripts and superscripts).

In NLQ mode, the quality of both alphanumeric and semigraphic printing is considerably improved, as the printing matrix is doubled from 9 x 9 to 18 x 9, giving more sharply defined characters. Draft mode gives high speed output for documents that do not require a particularly high quality of printing. HSD mode produces draft output at the maximum printing speed.

The printer can handle single sheets of paper, continuous stationery, paper rolls, and paper fed from automatic sheet feed.

The manufacturer original long-life ribbon cartridges make ribbon replacement a quick, clean operation.

The printer is connected to the computer via a parallel (Centronics-like) interface.

A set of industry standard compatible commands (IBM/EPSON) allows extreme flexibility of operation: layouts and graphic illustrations are easier to handle and printing quality is improved.

STRUCTURE OF THE MANUAL

The first four chapters explain how to install the printer, load the paper and the ribbon, and the printer connection and initialisation procedures. Chapter 5 explains the printer programming procedure (SET-UP mode). Chapters 6 to 9 explain printer control by the host computer and the emulations (with respective command codes) available.

The appendices contain the technical characteristics of the printer and the interface, the tables of character codes available, some printing examples, a troubleshooting guide and a summary of the command codes.

To get the best results from your printer and avoid possible damage, follow the instructions given in this manual carefully.

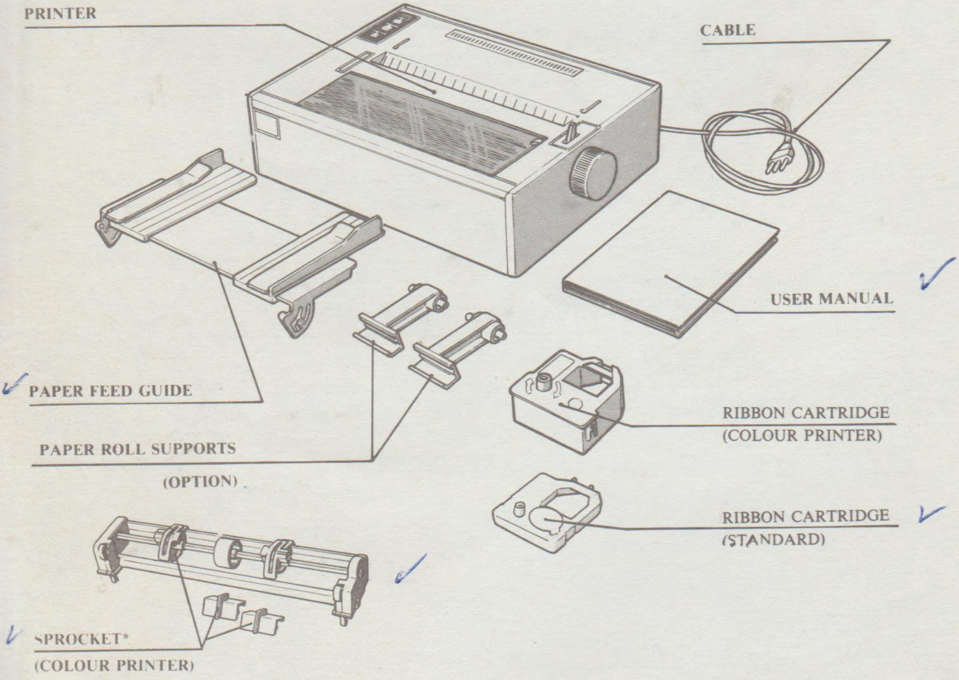
Any features peculiar to one or other of the printer models will be indicated clearly as and when encountered.

Unpacking

SAVE THE CARTON AND PACKING MATERIALS IN CASE YOU NEED TO RE-USE THEM

MAKE SURE ALL ITEMS ARE PRESENT, CHECKING THEM AGAINST THE FIGURE BELOW. IF SOMETHING IS MISSING OR DAMAGED, CONTACT YOUR DEALER IMMEDIATELY.

Fig. 1-1
Carton Contents


PRINTER
CABLE
USER MANUAL ✓
✓ PAPER FEED GUIDE
RIBBON CARTRIDGE (COLOUR PRINTER)
PAPER ROLL SUPPORTS (OPTION)
RIBBON CARTRIDGE (STANDARD) ✓
✓
✓ SPROCKET* (COLOUR PRINTER)

* OPTIONAL FOR STANDARD VERSION

The optional devices are included only if they have been ordered together with the printer; otherwise, they will be packed separately.

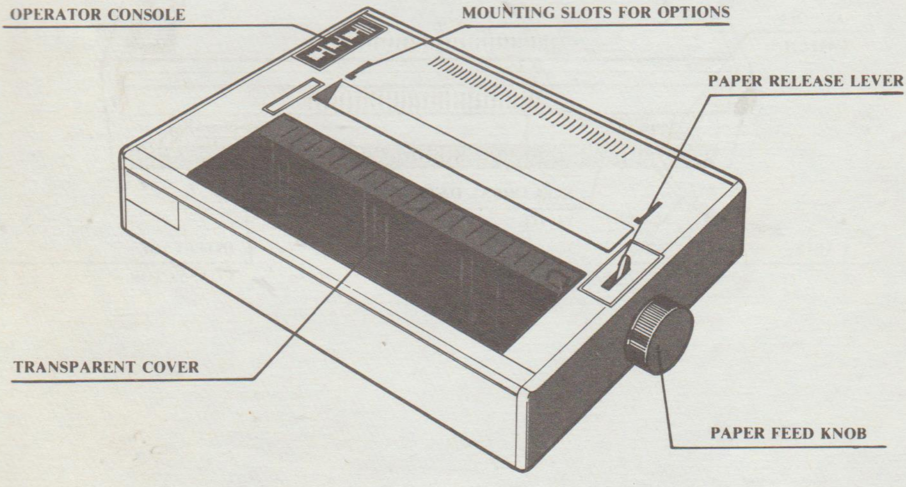
The printer is protected by a plastic bag which must be removed before installation.

Printer Presentation

This chapter locates and presents all the printer parts used by the operator.

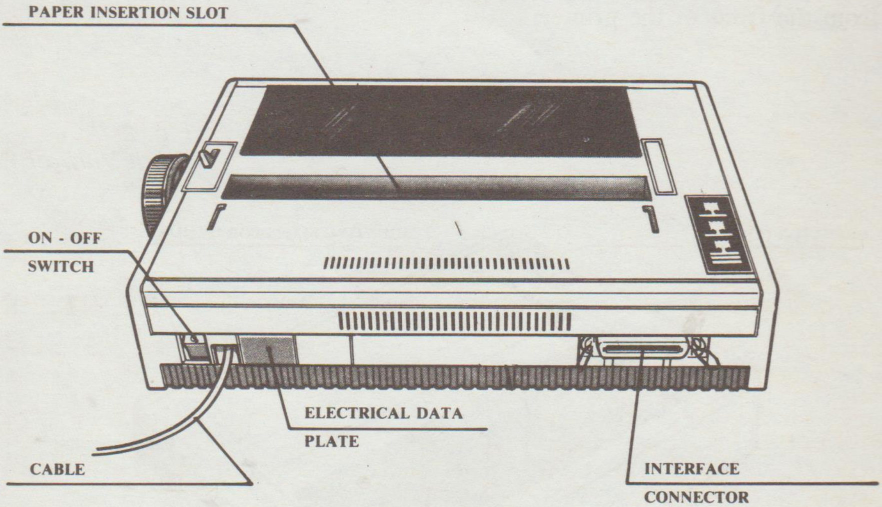
The figure below shows the parts that can be accessed from the front of the printer.

Fig. 2-1
Front View of Printer



Turning the printer 180, the parts illustrated in the following figure are visible.

Fig. 2-2
Rear View of Printer



OPERATING CONSOLE

On the operating console there are three LEDs (Light Emitting Diodes) and three keys.

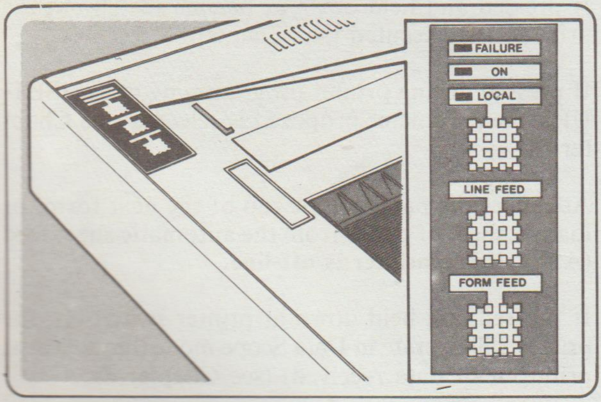


Fig. 2-3
Operating Console

LEDS

ON	Lit : printer powered.
LOCAL	Lit : printer off-line (does not receive from host computer) for paper/ribbon out.
	Off : printer on-line (able to receive from host computer).
FAILURE	Lit : printer fault (hardware fault).
	Flashing : minor fault (mechanical fault).

KEYS

LOCAL	Alternatively selects or deselects the printer.
LINE FEED	Advances the paper one line feed, **if the printer is off-line** ; if held down, the paper feed is continuous. If pressed and held down at printer switch-on, the print test is executed (see Chapter 4). If pressed during printer programming phase (SET-UP), the parameter proposed is selected (see Chapter 5).
FORM FEED	Advances the paper to the top of the next form, or loads a sheet of paper from the automatic sheet feed (ASF), **if the printer is off-line.** If pressed and held down at printer switch-on, the printer will operate in Data Scope mode (hexadecimal print-out of data received) (see Chapter 4). If pressed during printer programming phase (SET-UP), the parameter proposed is refused, and an alternative is proposed (see Chapter 5).

If **LINE FEED** and **FORM FEED** are held down together at switch-on, the printer enters SET-UP mode (see Chapter 5).

Paper Release Lever

Push the lever towards the rear of the printer to set the paper pressure rollers against the platen to allow printing on single documents or on the paper roll.

Push the lever towards the front of the printer to raise the paper pressure rollers from the platen for printing on continuous stationery (fed by the optional sprocket).

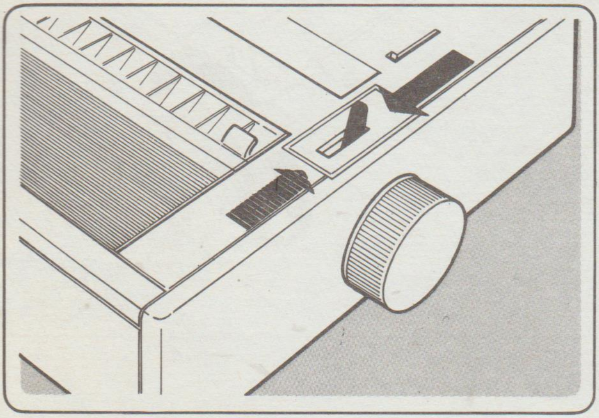


Fig. 2-4 Paper Release Lever

Paper Feed Knob

Allows manual control of paper loading and movement.

This knob functions only if the printer is Off-LINE (LOCAL LED ON) and if the paper release lever has been pushed towards the rear of the printer (see previous section).

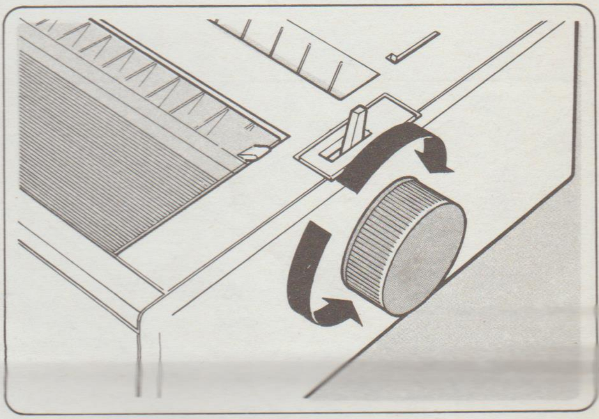


Fig. 2-5
Paper Feed Knob

3

Printer Installation

Read this chapter carefully before switching on the printer.

Place the printer on a flat surface with the operating console to your left and the paper feed knob to your right.

Never leave the printer exposed to direct sunlight.

RIBBON CARTRIDGE INSERTION

Ribbon Cartridge (Black) for Standard Printer

Use a manufacturer-original ''SMALL CART'' ribbon cartridge to guarantee operating compatibility and printing quality.

Set the printer off-line and open the transparent cover.

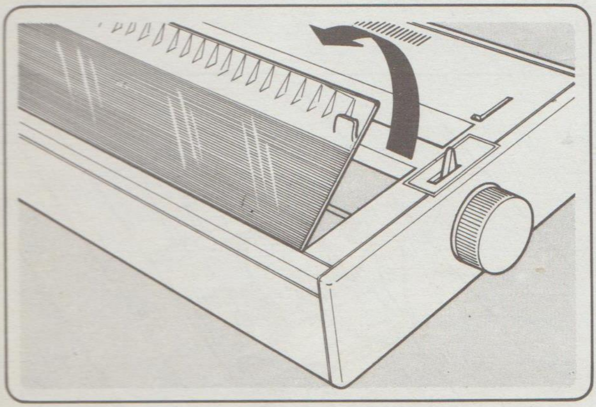


Fig. 3-1
Opening the Front Cover

Position the print head at the centre of the platen, sliding it gently along its guide.

If you are replacing the cartridge, first remove the used cartridge, pulling it upwards.

Position the new cartridge over the print head with the exposed ribbon towards the platen, ensuring that the ribbon is threaded between the print head and the metal guide.

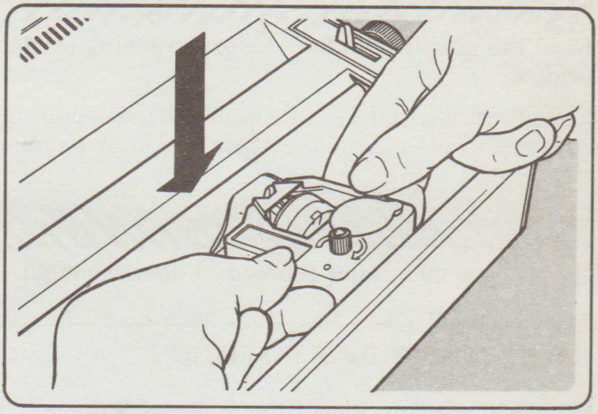


Fig. 3-2
Loading the Ribbon Cartridge

Insert the cartridge on the two mounting pins, pressing it down gently but firmly. If there is excessive resistance, reposition the cartridge and try again.

If necessary, turn the ribbon tension adjustment wheel on the cartridge clockwise to take up any ribbon that has come out of the cartridge during insertion.

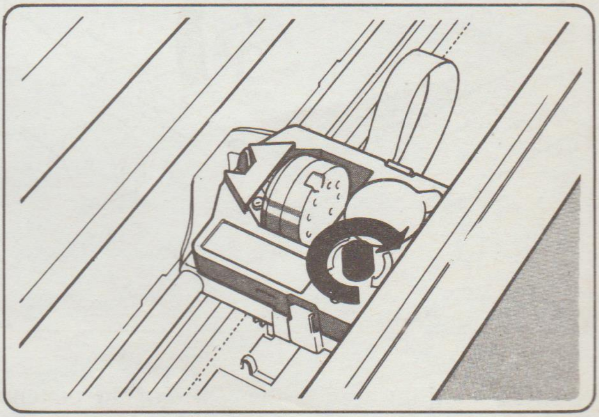


Fig. 3-3
Adjusting Ribbon Tension

Check that the cartridge is correctly aligned and firmly locked in place on the pins and that the ribbon is taut (both horizontally and vertically).

Close the transparent cover.

Ribbon Cartridge for Printer with Colour Feature

A black or coloured ribbon cartridge can be used.

If a black ribbon is used, the parameter selection in SET-UP mode (Chapter 5) must be **TYPE OF RIBBON = BLACK.** If a coloured ribbon is used, the parameter selection must be **TYPE OF RIBBON = COLOURED.**

To insert the ribbon cartridge in the printer, raise the transparent cover.

Position the print head at the physical left margin by sliding it gently along its guide.

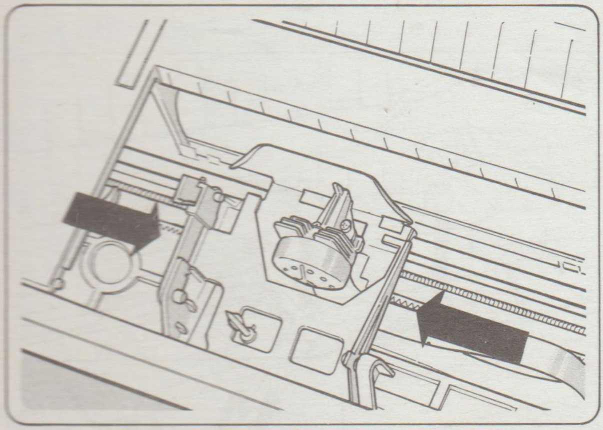
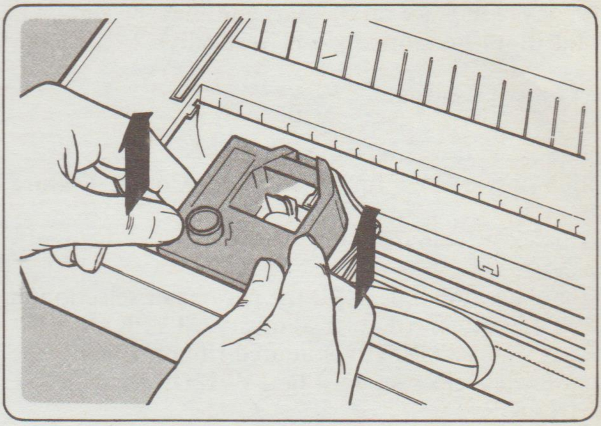


Fig. 3-4
Positioning the Print Head

If you are replacing the ribbon cartridge, first remove the used cartridge, pulling it upwards.

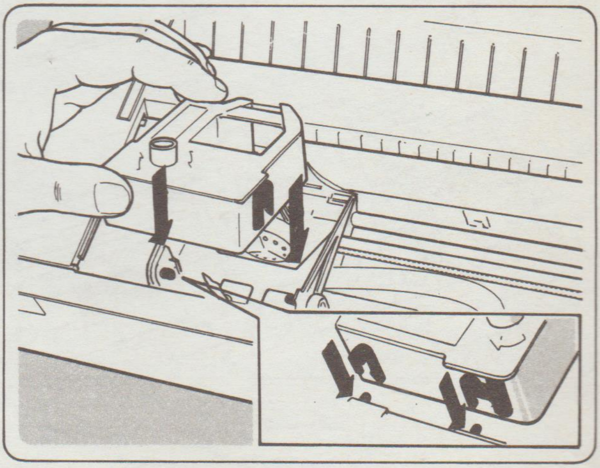
Fig. 3-5
Removing the Used Cartridge



Fit the new ribbon cartridge around the print head, making sure it is held firmly by the three stops and that the ribbon feed pin is inserted correctly.

Make sure the exposed ribbon is towards the platen, and threaded between the print head and the metal guide.

Fig. 3-6
Positioning the Cartridge



Insert the cartridge on the mounting pins, pressing it down gently but firmly. If there is excessive resistance, reposition the cartridge and try again.

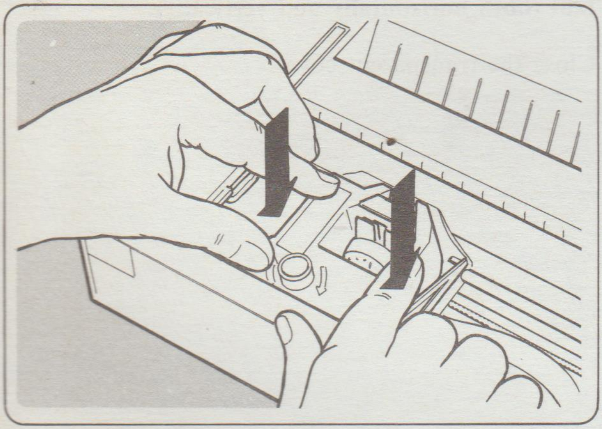


Fig. 3-7
Fixing the Cartridge in Position

If necessary, turn the ribbon tension adjustment wheel on the cartridge clockwise to take up any ribbon that has come out of the cartridge during insertion.

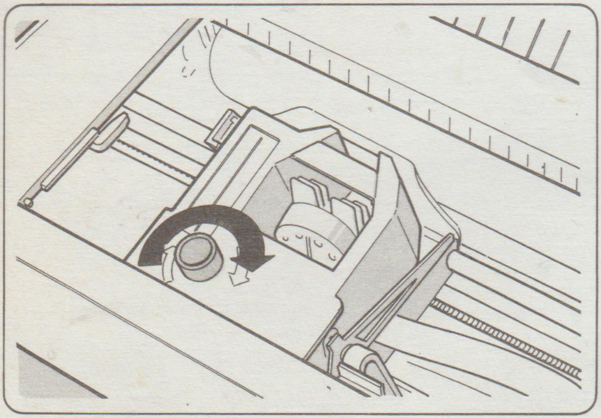


Fig. 3-8
Adjusting the Ribbon Tension

Check that the cartridge is correctly aligned and firmly locked in place on the pins and that the ribbon is taut (both horizontally and vertically).

Close the transparent cover.

PAPER LOADING

You can use most types of paper for printing (single sheets, continuous stationery (fan-fold forms and paper rolls):

Single sheets of paper should be between 5 and 9 in (127 - 229 mm) wide and at least 100 mm long, with a minimum top of form (TOF) and bottom of form (BOF) area of 27 mm. The paper weight may vary between 60 and 80 g/m^2.

Continuous stationery should be between 5 and 9.5 in (127 - 241.3 mm) wide. The paper weight (original only) may vary between 55 and 90 g/m^2. If an original plus one copy is used, the weight of the original may vary between 50 and 60 g/m^2, while that of the copy must be between 40 and 50 g/m^2. If carbon paper is used, it should be between 20 and 30 g/m^2. The thickness of the form must not exceed 0.18 mm.

Paper rolls should be between 5 and 9 in (127 - 229 mm) wide. The external diameter of the roll must not exceed 90 mm while the core diameter must be 12 or 25.4 mm. The paper weight may vary between 60 and 90 g/m^2.

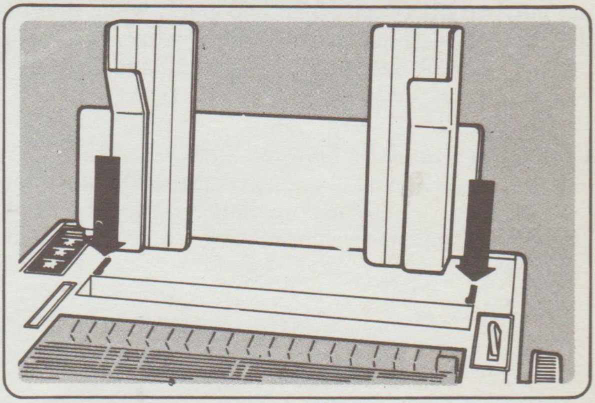
SINGLE SHEETS

To use single sheets of paper, you must first mount the paper feed device on the printer.

Inserting the Paper Feed Device

Holding the paper feed device vertically, insert its pins in the appropriate slots in the top rear of the printer casing, pushing it down until it is against the stops. Pressing the two flexible hooks on the paper feed support, insert them in the grooves and tip the paper feed back so that it is against them.

Fig. 3-9
Inserting the Paper Feed Device



The paper feed has two working positions:

1. horizontal; obtained by pressing it back until it is flat.

2. sloping; obtained by positioning it horizontally, and then pulling it forward until it clicks into place.

Check that the paper feed device is fixed firmly and correctly to the printer (and is in its sloping position for single sheet loading).

Manual Insertion of Single Sheet

Set the paper release lever towards the rear of the printer, so that the paper is fed by the platen.

Adjust the left hand guide of the paper feed so that the left hand edge of the paper is to the left of the first character position on the print line.

Adjust the right hand guide according to the width of the sheet of paper.

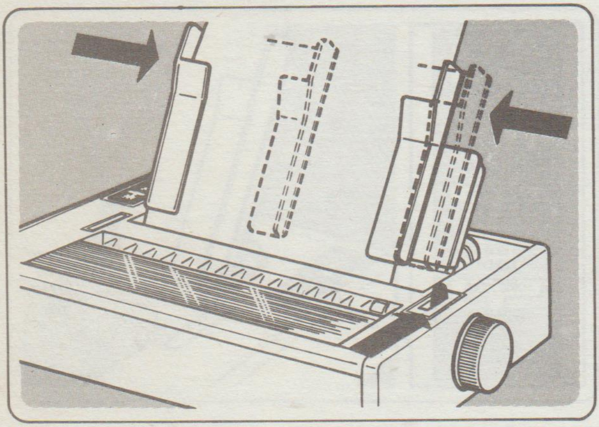


Fig. 3-10
Adjusting the Guides

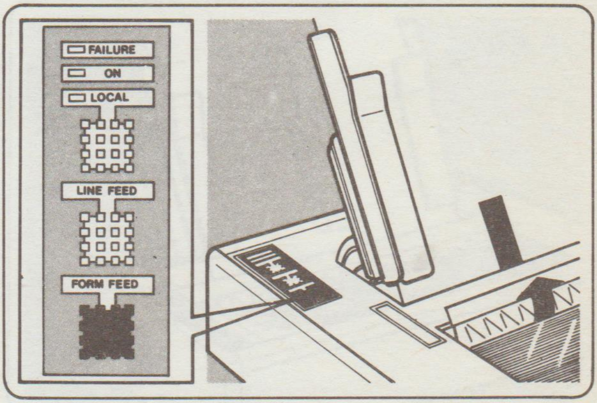
Insert the paper between the guides, pushing it into the slot that gives access to the platen. Turn the paper feed knob clockwise until the paper is in the print position, between the platen and the guide in front of it.

Automatic Insertion of Single Sheets

As this operation is executed with the printer switched on, read this section and the next chapter carefully BEFORE attempting it.

The paper positioning procedure is the same as that described for manual insertion, but the paper is fed in by pressing **FORM FEED** on the operating console.

Fig. 3-11 Automatic Insertion of Single Sheets



FORM FEED operates only if the printer is in Local (Off-Line LOCAL LED ON). If the LED is off, press LOCAL.

Continuous Feeding of Single Sheets

To use a pack of single sheets of paper, you must first mount the Automatic Sheet Feed (ASF) device on the printer.

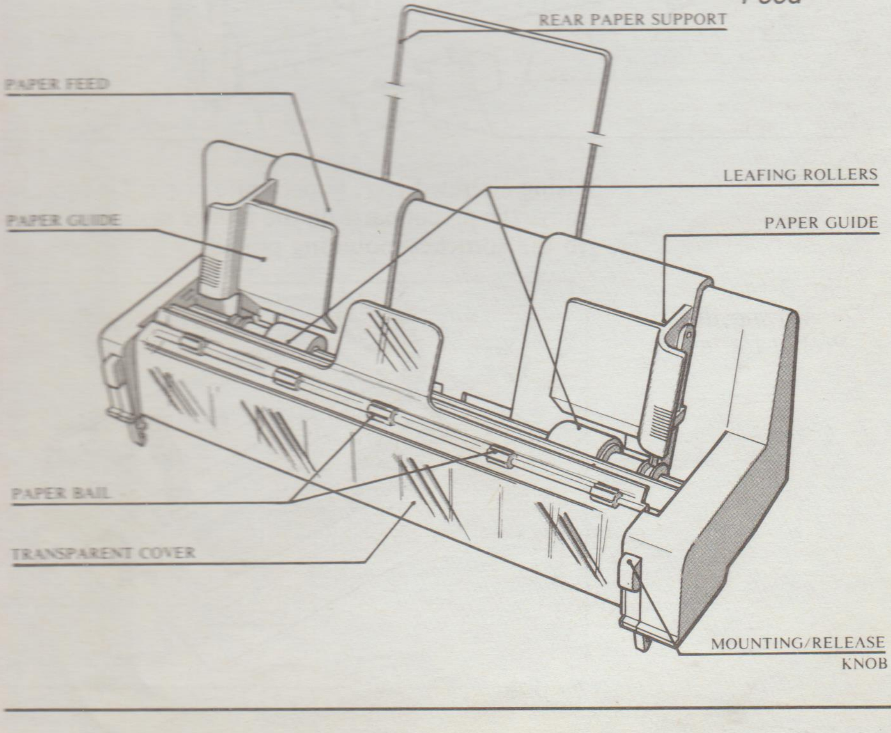
This option is packed separately. The assembly and installation instructions are included in the packing carton.

Automatic Sheet Feed

A pack of paper is loaded into the ASF, and then fed in automatically during the printing operation.

The ASF is a compact device measuring: 310 x 105 x 105 mm. It can handle up to 30 sheets, 5.9 to 8.6 in (150 - 218 mm) wide and 3.9 to 11.4 in (100 - 300 mm) long, weighing between 60 and 80 g/m². The minimum TOF and BOF areas are approximately 27 mm.

Fig. 3-12 Automatic Sheet Feed



CONTINUOUS STATIONERY

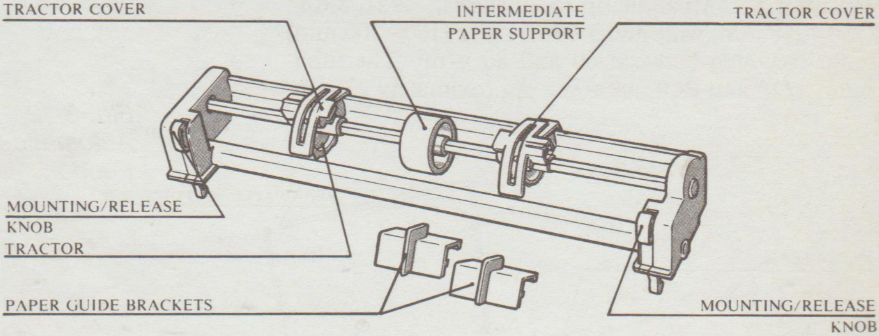
To use continuous stationery, you must first mount the sprocket paper feed device on the printer. This device is a standard accessory for the colour printer, and is included in the printer packing carton.

It is an optional for the standard version of the printer. If it is ordered with the printer, it will be included in the printer packing carton, otherwise it will be packed and delivered separately.

Mounting the Sprocket

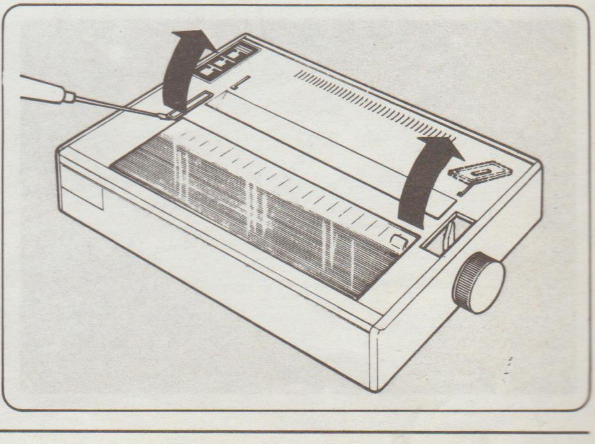
The following figure shows the parts with which you should be familiar.

Fig. 3-13 Sprocket



Using a screwdriver, paper knife or similar tool, remove the precut parts on the printer casing to access to the sprocket mounting points.

Fig. 3-14 Removing the Precut Parts



Position the paper release lever towards the front of the printer so that the sprocket can be mounted.

Insert the sprocket mounting pins in the two rear slots, sliding them into the guides.

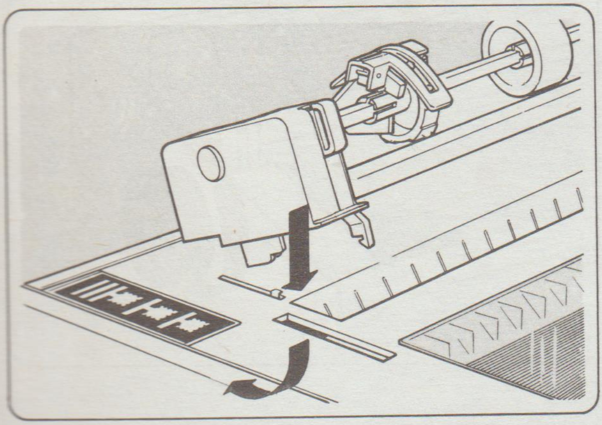


Fig. 3-15
Mounting the Sprocket

Pressing the knobs on either side of the front of the sprocket, pull it forward until it is against the front flexible stops.

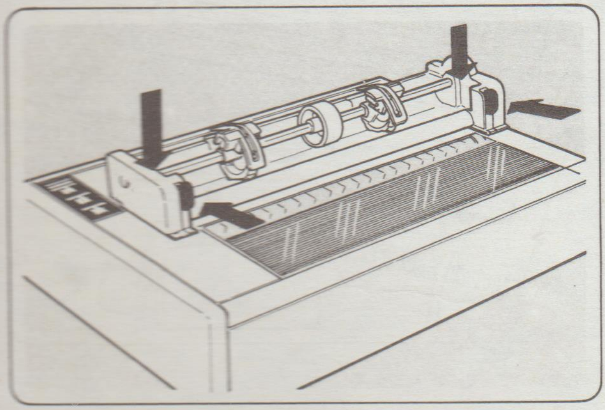
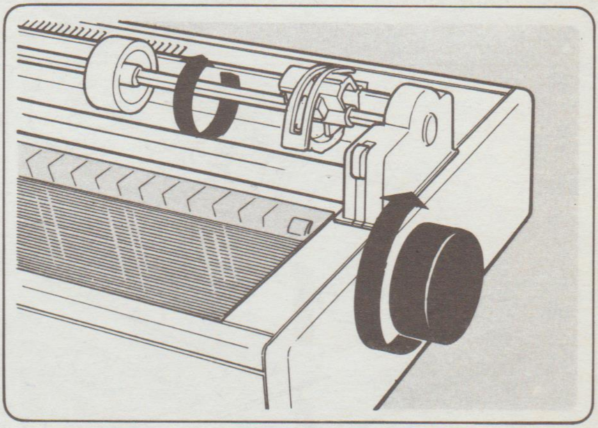


Fig. 3-16
Fixing the Sprocket in Position

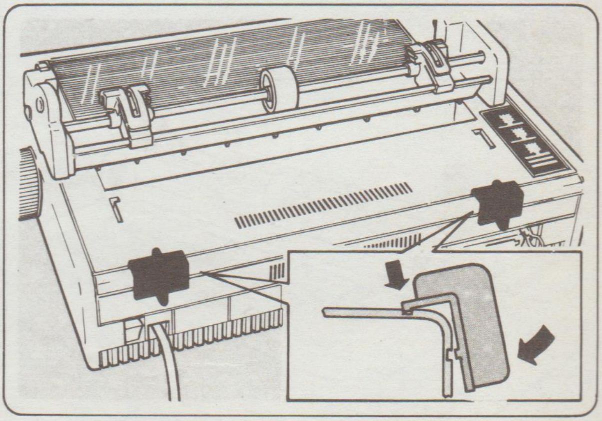
Check that the sprocket is mounted correctly: when you turn the paper feed knob, the metal shaft on which the feed tractors are mounted should rotate.

Fig. 3-17
Checking the Sprocket Function



Pressure-mount the pair of paper guide brackets in the groove on the rear of the printer.

Fig. 3-18
Mounting the Paper Guide Brackets



Loading Continuous Stationery

Insert the paper feed (see section entitled SINGLE SHEETS in this chapter) in its horizontal position.

Inserting the paper in the slot behind the platen, feed it under the tractors.

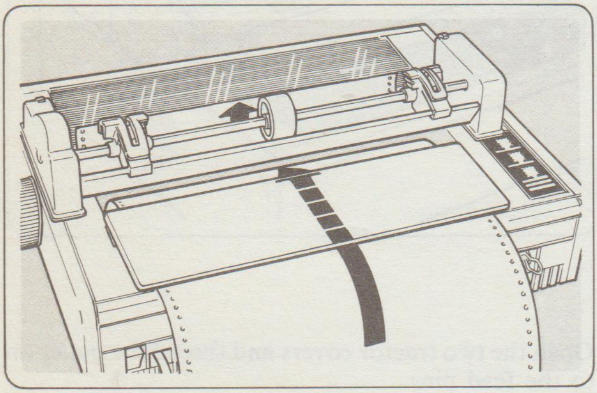


Fig. 3-19
Inserting Continuous Stationery

Guide the paper by hand until the leading edge feeds out between the platen and the paper guide.

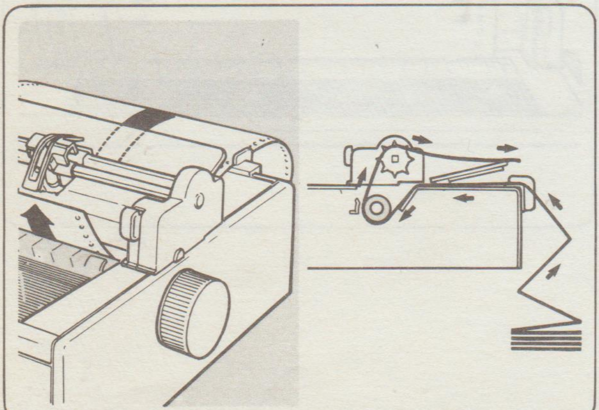
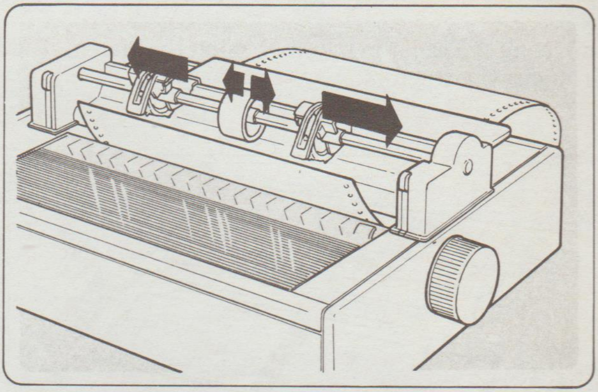


Fig. 3-20
Feeding Continuous Stationery round the Platen

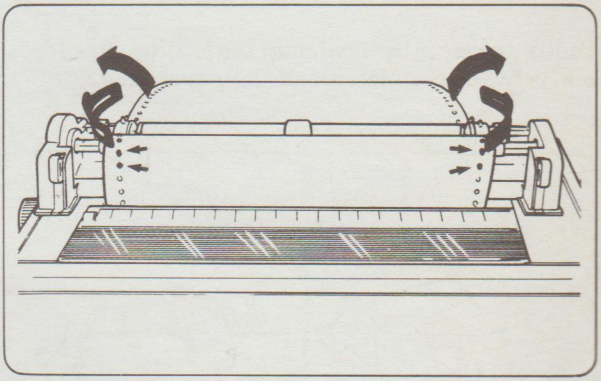
Adjust the two feed tractors and the intermediate paper supports according to the paper width.

Fig. 3-21
Adjusting the Sprocket



Open the two tractor covers and thread the paper on to the feed pins.

Fig. 3-22
Threading the Paper on to the Feed Pins



Close the tractor covers.

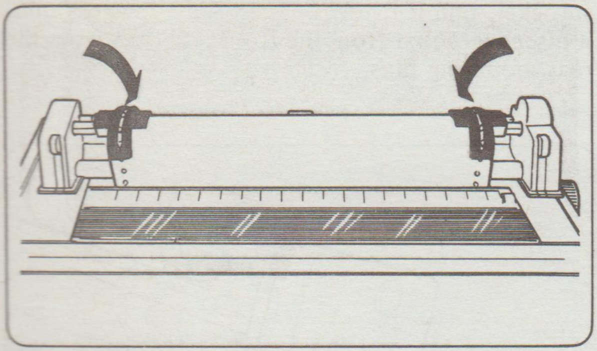


Fig. 3-23
Closing the Tractor Covers

Adjust the position of the paper guide brackets so that the paper feeds smoothly between them.

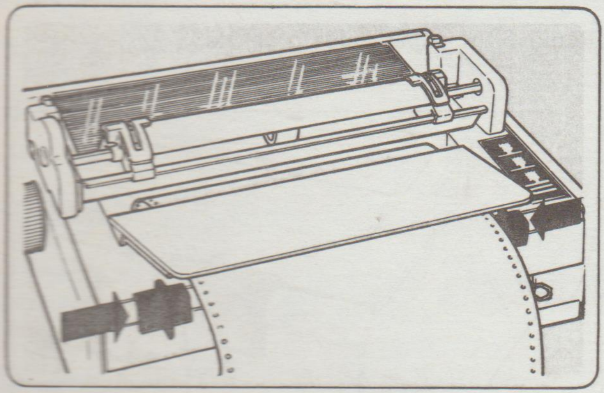


Fig. 3-24
Positioning the Paper Guide Brackets

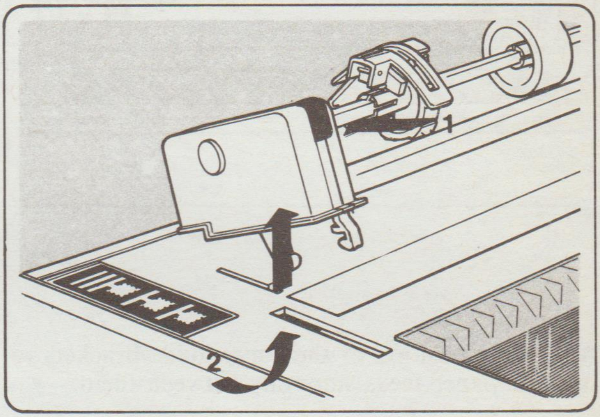
Turn the paper feed knob to advance the paper and regulate the tension by adjusting the tractors.

Make sure that the paper feed path is free of obstacles.

Removing the Sprocket

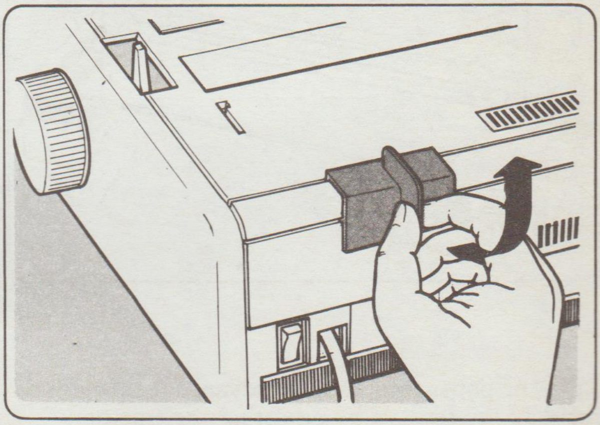
Pressing the knobs on either side of the front of the sprocket, pull it firmly but carefully upwards until it disengages first from the front and then from the rear mounting pins.

Fig. 3-25 Removing the Sprocket



Remove the paper guide brackets.

Fig. 3-26 Removing the Paper Guide Brackets



PAPER ROLLS

To use paper rolls, you must first mount the paper roll supports on the printer.

If this option is ordered with the printer, it will be included in the printer packing carton, otherwise it will be packed and delivered separately.

Press the two supports into the groove on the rear of the printer.

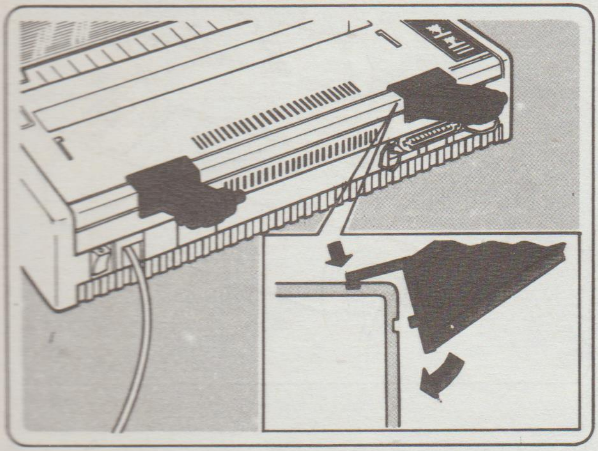


Fig. 3-27
Mounting the Paper Roll Supports

Insert the paper feed (see section entitled SINGLE SHEETS in this chapter) in its horizontal position.

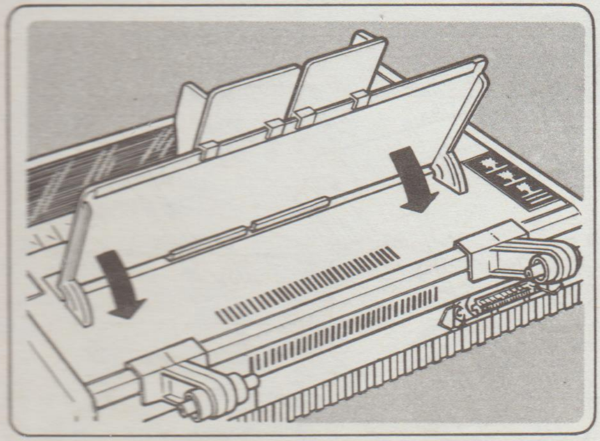


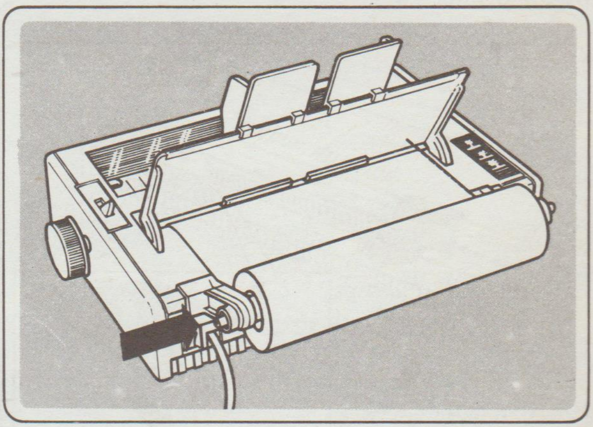
Fig. 3-28
Positioning the Paper Feed

Position the left hand paper roll support so that the left hand edge of the roll is to the left of the first character position on the print line.

Push the paper release lever towards the rear of the printer to allow feed out from the paper roll.

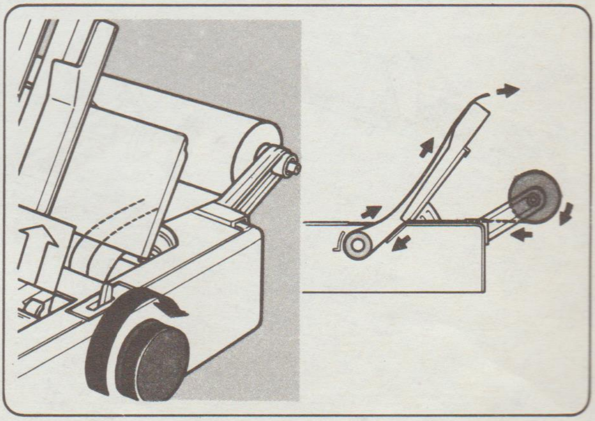
Insert the paper roll between the supports, adjusting the right hand support only. **The leading edge of the paper must feed out from BELOW the roll.**

Fig. 3-29
Inserting the Paper Roll



Unwind the paper from below, following the path shown in the following figure. Turn the knob to advance the paper. Check that the paper passes between the platen and the paper guide.

Fig. 3-30
Paper Feed Path



Pull the paper release lever forward to free the paper. Align the paper on the platen, adjusting the tension, if necessary. Adjust the paper feed guides so that they do not interfere with the paper feed path.

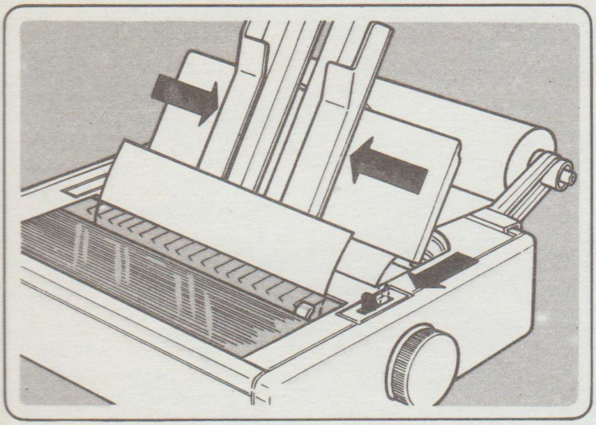


Fig. 3-31
Aligning the Paper

Push the paper release lever towards the rear of the printer to allow the platen to feed the paper through.

After printing, the paper can be torn off along the edge of the transparent cover.

Read the next chapter carefully BEFORE switching on the printer.

CONNECTION TO HOST COMPUTER

The printer has a Centronics-like parallel interface and is connected to the host computer by means of an interface cable which is supplied with the computer.

Plug the connector (male) into the socket on the printer (female), securing it firmly with the spring clips provided.

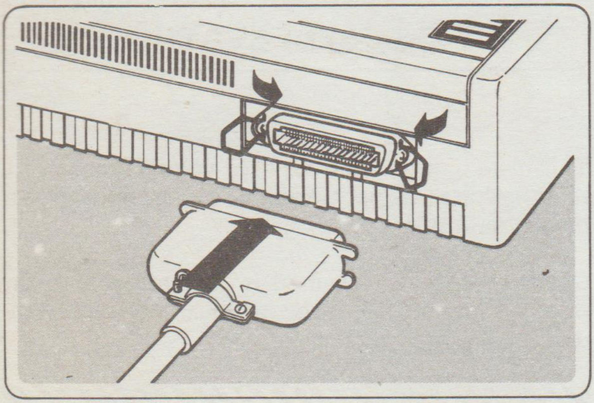


Fig. 4-1
Connecting the Interface Cable

The cable length must not exceed 3 metres.

Contact your dealer or service technician for advice if you have any doubts.

The printer can now be controlled by the computer using the command codes (see chapter 6).

CONNECTION TO MAINS POWER SUPPLY

First of all, check the electrical data on the plate on the rear of the printer.

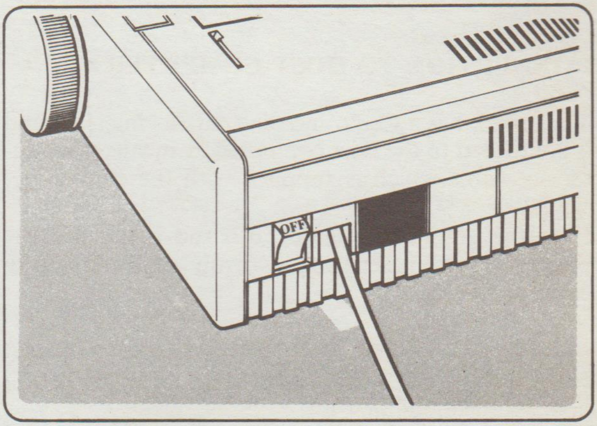


Fig. 4-2
Electrical Data Plate

This plate indicates the required voltage; make sure that the voltage supply available corresponds to that on the data plate.

Check that the socket used is compatible with the printer plug and conforms to local electrical standards.

If the voltage supplied or the mains socket are not those required, contact your dealer immediately.

DO NOT ATTEMPT TO CONNECT THE PRINTER.

To connect the printer to the mains, proceed as follows.

Check that the printer ON/OFF switch is in the "O" position (OFF).

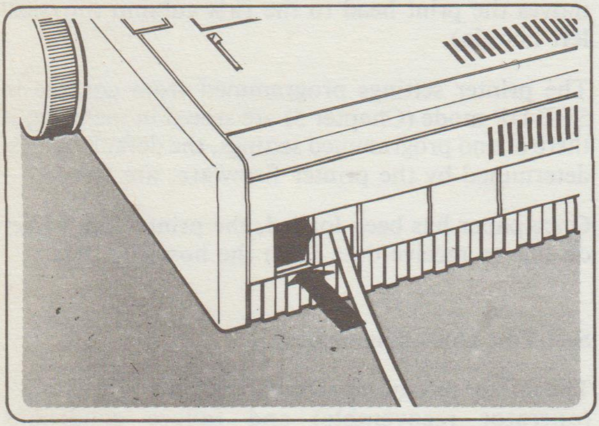


Fig. 4-3
Switch in OFF Position

Plug the printer power supply cable into a socket which guarantees the required voltage.

Switch on the printer, pressing the part marked "ON" on the ON/OFF switch.

INITIALISATION

At power-on, the ON LED on the operating console lights up.

The printer runs the self-test (Autodiagnostics) and moves the print head to the first column (physical left margin).

The printer settings programmed from console in SET-UP mode (Chapter 5) are stored in memory; if there are no programmed settings, the default values, determined by the printer firmware, are stored.

Once paper has been loaded, the printer can be set on-line to receive data from the host computer.

Self-Test (Autodiagnostics)

The printer recognises automatically the ''paper out'' (operator recoverable) and failure conditions (recoverable by the service technician).

Paper Out

At approximately 27 cm from the end of the paper, the printer stops and the LOCAL LED lights. To resume printing, load more paper, without switching off the printer, and press **LOCAL.**

Failure

The **FAILURE** LED on the operating console lights to warn the operator of a printer malfunction.

If the LED is:

- ON and steady, this indicates a failure that cannot be recovered by the operator; the service technician MUST be called.
- ON and flashing, this indicates a minor failure that can, in some cases, be recovered by the operator (see TROUBLESHOOTING GUIDE - Appendix E).

Hexadecimal Print-Out (DATA SCOPE)

The data received from the computer can also be printed in hexadecimal code (DATA SCOPE) to check correct behaviour of the printer in response to the codes received.

To print the data received from the computer in hexadecimal code, hold down **FORM FEED** and switch ON the printer.

The computer will send, for example, the following data:

```
LPRINT CHR$(27);‘A’;CHR$(1);
```

and the following characters are printed:

```
1B 41 01
```

To clear this setting, switch the printer OFF and then ON again.

Printing Test

The printing test allows you to check that the printer is working correctly.

If you hold down **LINE FEED** while you switch on the printer, the complete character set will be printed in the layout shown in the following figures. The entire test, which requires three 12 in forms (continuous stationery), ends automatically, the paper is fed to the top of the next form, and the printer goes ‘‘ON-LINE’’ ready to receive data from the host computer.

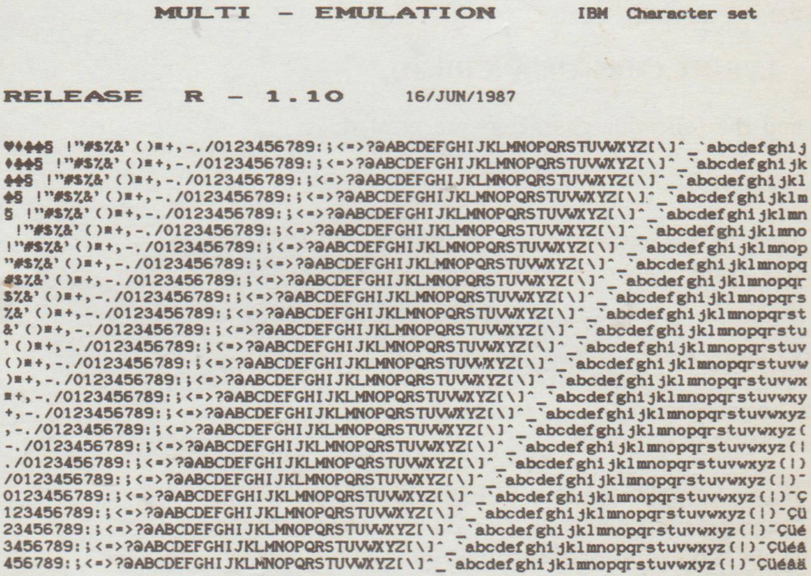
To interrupt the test, switch off the printer.

The test is performed only if the paper is inserted correctly.

The test will be printed in one of two versions and in Draft and NLQ mode (the test version and the print mode are defined in SET-UP mode see Chapter 5).

The first line of the test indicates the printer(s) emulated, the second, **Release n.nn** (where n.n varies between 0.00 and 9.99), the printer firmware version.

Fig. 4-4
Print Test Example



```
          MULTI  -  EMULATION        IBM  Character set


RELEASE    R  -  1.10       16/JUN/1987

♥♦♣♠§ !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghij
♦♣♠§ !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijk
♣♠§ !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijkl
♠§ !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklm
§ !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmn
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnop
"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopq
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqr
$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrs
%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrst
&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstu
'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuv
()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvw
)*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwx
*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy
+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz
,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz(
-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz(|
./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz(|)
/0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz(|)~
0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz(|)~Ç
123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz(|)~Çü
23456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz(|)~Çüé
3456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz(|)~Çüéâ
456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz(|)~Çüéâä
```

Programming the Printer

The printer settings are programmed by confirming or refusing a series of parameters which are proposed by printer firmware and printed out when the printer is in SET-UP mode.

If the ASF or sprocket option is mounted, it must be removed before you start to program the printer.

Insert a sheet of paper in the printer (see Chapter 3). The paper must be at least 8.3 in (210 mm) wide and 15.7 in (400 mm) long, and aligned slightly to the left of the first character position on the print line (to guarantee that all the information is printed on the page).

To access SET-UP mode, press and hold down both **LINE FEED** and **FORM FEED** as you switch on the printer.

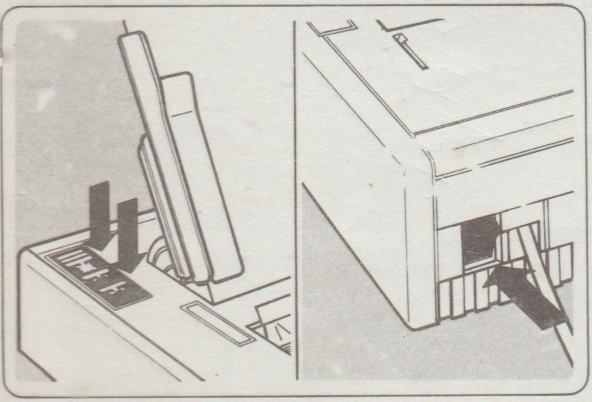


Fig. 5-1
Accessing SET-UP Mode

SET-UP MODE

One at a time, the programming parameters will be printed automatically. Press **LINE FEED** to confirm the parameter proposed, or **FORM FEED** to refuse it.

Programming can be interrupted at any point, by pressing **LOCAL**, and can be cleared completely or confirmed by refusing or accepting respectively the last parameter proposed. The printer will then exit automatically from SET-UP mode and remains ready to receive data from the host computer.

If the printer is switched off, or if there is a power failure, during programming phase, any parameters already selected will be lost, and replaced with the default values.

Fig. 5-2
Programming
Example

```
TO CONFIRM PRESS LF,  TO CHANGE PRESS FF,  TO  END  PRESS LOCAL


PRINTER EMULATED
EPSON FX 80      PROPRINTER

CHARACTER SET
INTERNATIONAL 1 INTERNATIONAL 2 SPAIN


CHARACTER DEFINITION
N.L.Q.  DRAFT

CHARACTER SPACING
10

WOULD YOU LIKE TO STORE THESE PARAMETERS ?
YES

CHANGES EXECUTED
```

To obtain the example in the previous figure, proceed as follows:

Load a sheet of paper and access SET-UP mode.

The following message is printed:

TO CONFIRM PRESS LF, TO CHANGE PRESS FF, TO END PRESS LOCAL

PRINTER EMULATED
EPSON FX 80

Press **FORM FEED.** The parameter proposal **EPSON FX 80** is refused and the proposal is reprinted as follows:

EPSON FX 80 PROPRINTER

Press **FORM FEED.** The parameter proposal **PROPRINTER** is refused and the proposal is reprinted as follows:

EPSON FX 80 PROPRINTER IBM G. P.

Press **LINE FEED** to accept the parameter **IBM G. P.** which selects IBM GRAPHIC PRINTER emulation.

A new parameter proposal is printed:

CHARACTER SET
INTERNATIONAL 1

Press **FORM FEED.** The parameter proposal **INTERNATIONAL 1** is refused and the proposal is reprinted as follows:

INTERNATIONAL 1 INTERNATIONAL 2

Press **LINE FEED** to accept the parameter **INTERNATIONAL 2** which selects the INTERNATIONAL 2 character set.

A new parameter proposal is printed:

CHARACTER DEFINITION
N.L.Q

To interrupt the printer programming, press **LOCAL.**

The following message is printed:

WOULD YOU LIKE TO STORE THESE PARAMETERS?
YES

Press **LINE FEED** to accept the parameter **YES** which confirms the two settings defined:

1. **PRINTER EMULATED: IBM G. P.**

2. **CHARACTER SET: INTERNATIONAL 2**

The following message is printed:

CHANGES EXECUTED

and the printer exits automatically from SET-UP mode.

To clear the two parameter settings just defined, after the message:

WOULD YOU LIKE TO STORE THESE PARAMETERS?
YES

press **FORM FEED** to refuse the parameter **YES** and the proposal is reprinted as follows:

WOULD YOU LIKE TO STORE THESE PARAMETERS?
YES NO

Press **LINE FEED** to confirm the parameter **NO**

The following message is printed:

NO CHANGES EXECUTED

The printer then exits from SET-UP mode.

PROGRAMMABLE PARAMETERS

The following table contains all the parameter groups and the options available (the default values are in **BOLDFACE**).

PARAMETERS	OPTIONS
PRINTER EMULATED	**IBM G. P.** (Graphics Printer) - IBM PROPRINTER - EPSON FX-80*
CHARACTER SET If an IBM printer is emulated:	**INTERNATIONAL 1** - INTERNATIONAL 2 - SPAIN - PORTUGAL - GREECE - ISRAEL (INTERNATIONAL 2) (DENMARK2) (TURKEY)*
If the EPSON printer is emulated:	**USA** - FRANCE - GERMANY/GREAT BRITAIN - DENMARK/SWEDEN - ITALY - SPAIN

* There are two alternatives (different ROM): TURKEY or INTERNATIONAL 2 and DENMARK 2.

CHARACTER DEFINITION	**H.S.D.** - DRAFT - N.L.Q.
TYPE OF RIBBON (Only for printer with colour feature)	**COLOURED** - BLACK
AUTOMATIC SHEET FEEDER	**NO** (Not present/not selected) - YES (Present and selected)
DOUBLE STRIKE PRINTING	**MONODIRECTIONAL** - BIDIRECTIONAL
CHARACTER SPACING (print pitch cpi)	**10** - 12 - 15 - 17.1 - 20 - 24
ENABLE D.L.L.	
Standard Printer	**YES 4K BYTE L.B** - NO 7K BYTE L.B
Colour Printer	**YES 2.5K BYTE L.B** - NO 5.5K BYTE L.B
LINE FEED	**LF = LF + CR** - LF = LF
CARRIAGE RETURN	**CR = CR** - CR = CR + LF

▶

PARAMETERS	**OPTIONS**
PAPER END DETECTION	**YES** (enabled) - NO (disabled)
LINE SPACING (in inches)	**1/6** - 7/72 - 1/8
SLASHED ZERO	**YES** - NO
DC1/DC3 PROCEDURE (DC1/DC3 Dialogue Procedure)	**NO** (disabled) - YES (enabled)
FORM LENGTH (in inches)	**12** - 11 - 10 - 9 - 8 - 7 - 6 - 5
SKIP OVER PERFORATION (BOF) (bottom of form in inches)	**0** - 1/3 - 1/2 - 2/3 - 1 - 2
BIDIRECTIONAL B.I.M. (Bit Image Mode graphic printing)	**NO** (disabled) - YES (enabled)
PROPORTIONAL SPACING	**NO** (disabled) - YES (enabled)
CHARACTER LENGTH	**8 bits** 7 bits

* EPSON JX-80 for printer with colour feature.

Printer Control by Host Computer

EMULATIONS

Several emulation environments are available for the various printer models: IBM Graphics Printer, IBM Proprinter, EPSON FX-80, EPSON JX-80 (for printers with the colour feature, in alternative to EPSON FX-80). You must select the emulation you intend use during the printer SET-UP procedure (see Chapter 5).

COMMAND CODES

Normally all the printing operations are control by the host computer software. The experienced user can create his own printing application programs using the control and command codes described in this chapter.

The command codes recognised and executed by the printer will depend on the printer emulation selected during printer SET-UP. They are grouped according to their function (see the summary tables which follow).

The following notation will be used for the presentation of the command code:

Example:

Byte 01000001 = 65(Decimal) = 41(Hexadecimal) = A(ASCII).

For simplicity it will be written thus: **(65)D or (41)H or A**

The code ESC (27D) is interpreted as an ‘‘Escape Sequence’’, and the code which follows it will define the function of the command transmitted. In some cases the third byte of an Escape Sequence is used to close the sequence or to quantify the data to be handled. The data variable will be expressed as follows:

Variable = ‘‘n’’ (‘‘n_1’’, etc.)

Meaning: the variable ‘‘n’’ must be input in its decimal format.

(E.g.: If the number entered is 65, n = A (ASCII equivalent of 65D)).

This notation is valid throughout the chapter unless another form is expressly defined.

Some features are enabled and disabled using codes 1 and 0 (49D and 48D) in the third byte of the Escape Sequence. Codes SOH (1D) and NUL (0D) respectively can be used for the same purpose.

As in some cases the command code is peculiar to a specific emulation, while in others it is common to several, the description of each command code will be preceded by an indication of the emulation(s) under which it is recognised. The following symbology will be used: **GP** for IBM Graphics Printer, **PRO** for IBM Proprinter, **FX** for EPSON FX-80 and **JX** for EPSON JX-80.

Summary of Command Codes

Code			Function	Emulation				Page
ASCII	DEC	HEX						

BASIC COMMANDS

BS	8	08	Backspace	GP	PRO	FX	JX	6.7
HT	9	09	Horizontal tabulation	GP	PRO	FX	JX	6.7
LF	10	0A	1 line feed	GP	PRO	FX	JX	6.7
VT	11	0B	1 line feed	GP	—	—	—	6.7
VT	11	0B	Vertical tabulation	—	PRO	FX	JX	6.7
FF	12	0C	Form Feed	GP	PRO	FX	JX	6.8
CR	13	0D	Carriage Return	GP	PRO	FX	JX	6.8

MARGINS

ESC C	27 67	1B 43	Defines form length	GP	PRO	FX	JX	6.9
ESC N	27 78	1B 4E	Sets BOF (Bottom of Form)	GP	PRO	FX	JX	6.10
ESC O	27 79	1B 4F	Clears BOF	GP	PRO	FX	JX	6.10
ESC 4	27 52	1B 34	Sets TOF (Top of Form)	—	PRO	—	—	6.10
ESC Q	27 81	1B 51	Sets right hand margin	—	—	FX	JX	6.9
ESC l	27 108	1B 6C	Sets left hand margin	—	—	FX	JX	6.9

LINESPACING

ESC 0	27 48	1B 30	Line feed = 1/8 in	GP	PRO	FX	JX	6.11
ESC 1	27 49	1B 31	Line feed = 7/72 in	GP	PRO	FX	JX	6.11
ESC 2	27 50	1B 32	Line feed = 1/6 in	—	—	FX	JX	6.11
ESC 2	27 50	1B 32	Executive command for ESC A	GP	PRO	—	—	6.11
ESC 3	27 51	1B 33	Line feed = n/216	GP	PRO	FX	JX	6.11
ESC A	27 65	1B 41	Line feed = n/72 in	GP	PRO	FX	JX	6.11

PRINT PITCHES

SI	15	0F	Sets 17.1 cpi print pitch	GP	PRO	FX	JX	6.12
DC2	18	12	Clears 17.1 cpi print pitch	GP	PRO	FX	JX	6.12
ESC M	27 77	1B 4D	Sets 12 cpi print pitch	GP	—	FX	JX	6.12
ESC P	27 80	1B 50	Restores 10 cpi print pitch	GP	—	FX	JX	6.12
ESC [	27 91	1B 5B	Selects print pitch	GP	—	—	—	6.12
ESC :	27 58	1B 3A	Sets 12 cpi print pitch	—	PRO	—	—	6.12
DC2	18	0F	Restores 10 cpi print pitch	—	PRO	—	—	6.12
ESC SI	27 15	1B 0F	Same as SI	—	—	FX	JX	6.12
ESC p	27 112	1B 70	Sets/clears proportional pitch	—	—	FX	JX	6.12

TABULATION

ESC D	27 68	1B 44	Horizontal tabulation program	GP	PRO	FX	JX	6.13
ESC B	27 66	1B 42	Vertical tabulation program	—	PRO	FX	JX	6.13
ESC R	27 82	1B 52	Clears tabulation stops	—	PRO	—	—	6.13
ESC b	27 98	1B 62	Multiple vert. tab. programs	—	—	FX	JX	6.14
ESC /	27 47	1B 2F	Selects vert. tab. program	—	—	FX	JX	6.14

CHARACTER ATTRIBUTES

ESC W	27 87	1B 57	Double width printing	GP	PRO	FX	JX	6.15
SO	14	0E	Sets double width printing	GP	PRO	FX	JX	6.15
ESC SO	27 14	1B 0E	Same as SO	GP	PRO	FX	JX	6.15
DC4	20	14	Clears double width printing	GP	PRO	FX	JX	6.15
ESC E	27 69	1B 45	Sets boldface printing	GP	PRO	FX	JX	6.15
ESC F	27 70	1B 46	Clears boldface printing	GP	PRO	FX	JX	6.15
ESC G	27 71	1B 47	Sets double strike printing	GP	PRO	FX	JX	6.15
ESC H	27 72	1B 48	Clears double strike printing	GP	PRO	FX	JX	6.15
ESC —	27 45	1B 2D	Underscored printing	GP	PRO	FX	JX	6.15
ESC S	27 83	1B 53	Superscripts/subscripts	GP	PRO	FX	JX	6.16

▶

CHARACTER ATTRIBUTES (continued)

ESC T	27 84	1B 54	Clears superscripts/subscripts	GP	PRO	FX	JX	6.16
ESC x	27 120	1B 78	Draft-HSD/NLQ printing	GP	—	—	—	6.16
ESC _	27 95	1B 5F	Overscored printing	—	PRO	—	—	6.16
ESC 4	27 52	1B 34	Sets Italic printing	—	—	FX	JX	6.16
ESC 5	27 53	1B 35	Clears Italic printing	—	—	FX	JX	6.16
ESC !	27 33	1B 21	Selects combined attributes	—	—	FX	JX	6.17

CHARACTER SETS

ESC 6	27 54	1B 36	Selects Table 2 character set	GP	PRO	—	—	6.18
ESC 7	27 55	1B 37	Selects Table 1 character set	GP	PRO	—	—	6.18
ESC \	27 92	1B 5C	Prints from extended table (n)	—	PRO	—	—	6.18
ESC ^	27 94	1B 5E	Prints from extended table (1)	—	PRO	—	—	6.20
ESC 7	27 55	1B 37	Selects basic character set	—	—	FX	JX	6.18
ESC 6	27 54	1B 36	Extends character set	—	—	FX	JX	6.21
ESC R	27 82	1B 52	Selects national character set	—	—	FX	JX	6.18
ESC I	27 73	1B 49	Extends national character set	—	—	FX	JX	6.20

GRAPHICS

ESC K	27 75	1B 4B	Selects 60 dpi BIM	GP	PRO	FX	JX	6.22
ESC L	27 76	1B 4C	Selects 120 dpi BIM	GP	PRO	FX	JX	6.23
ESC Y	27 89	1B 59	Selects 120 dpi, v=2 BIM	GP	PRO	FX	JX	6.23
ESC Z	27 90	1B 5A	Selects 240 dpi BIM	GP	PRO	FX	JX	6.23
ESC *	27 42	1B 2A	Immediate BIM selection	GP	—	FX	JX	6.24
ESC ?	27 63	1B 3F	Reassigns BIM command value	—	—	FX	JX	6.24
ESC ^	27 94	1B 5E	Selects 9-needle BIM	—	—	FX	JX	6.25

DOWN-LINE LOADING (DLL)

ESC =	27 61	1B 3D	Character definition/loading	—	PRO	—	—	6.26
ESC I	27 73	1B 49	Selects character set and definition	—	PRO	—	—	6.29
ESC &	27 38	1B 26	Character definition/loading	—	—	FX	JX	6.30
ESC %	27 37	1B 25	Selects standard/DLL character set	—	—	FX	JX	6.33
ESC :	27 58	1B 3A	Copies ROM into RAM	—	—	FX	JX	6.33

DATA CONTROL

CAN	24	18	Clears print buffer	GP	PRO	FX	JX	6.34
DC1	17	11	Selects printer	—	PRO	FX	JX	6.34
ESC Q	27 81	1B 51	Deselects printer	—	PRO	—	—	6.34
ESC 5	27 53	1B 35	Automatic Line Feed		PRO	—	—	6.34
DC3	19	13	Deselects printer	—	—	FX	JX	6.34
ESC @	27 64	1B 40	General reset	—	—	FX	JX	6.34
ESC =	27 61	1B 3D	Sets MSB (2^7) to 0	—	—	FX	JX	6.35
ESC >	27 62	1B 3E	Sets MSB (2^7) to 1	—	—	FX	JX	6.35
ESC #	27 35	1B 23	Clears forcing of bit 2 (MSB)	—	—	FX	JX	6.35
DEL	127	7F	Delete	—	—	FX	JX	6.35

COLOUR PRINTING

ESC b	27 98	1B 62	Colour printing: black	GP	PRO	—	—	6.36
ESC c	27 99	1B 63	Colour printing: cyan	GP	PRO	—	—	6.36
ESC m	27 109	1B 6D	Colour printing: magenta	GP	PRO	—	—	6.36
ESC y	27 121	1B 79	Colour printing: yellow	GP	PRO	—	—	6.36
ESC r	27 114	1B 72	Colour selection	GP	PRO	—	JX	6.36

OTHERS

ESC J	27 74	1B 4A	n/216 in paper feed	GP	PRO	FX	JX	6.37
ESC 8	27 56	1B 38	Disables paper out microswitch	GP	—	FX	JX	6.37
ESC 9	27 57	1B 39	Enables paper out microswitch	GP	—	FX	JX	6.37
ESC U	27 85	1B 55	Mono/bidirectional printing	—	PRO	FX	JX	6.37
ESC EM	27 25	1B 19	Enables/disables ASF	—	—	FX	JX	6.38
ESC <	27 60	1B 3C	Left-right monodir. printing	—	—	FX	JX	6.38
ESC i	27 105	1B 69	Immediate character printing	—	—	FX	JX	6.38
ESC j	27 106	1B 6A	n/216 in reverse paper feed	—	—	FX	JX	6.38
ESC s	27 115	1B 73	Sets/clears half-speed printing	—	—	FX	JX	6.38

BASIC OPERATIONS

The command in this section usually also cause the printing of the buffer contents.

BS GP PRO FX JX	(8)D ; (08)H	**Backspace** Moves the print position back one character space.
HT GP PRO FX JX	(9)D ; (09)H	**Horizontal Tabulation** Moves the print position to the next horizontal tabulation stop (defined using ESC D).
LF GP PRO FX JX	(10)D ; (0A)H	**Line Feed** Executes a single line feed (line feed value programmed from line, or using ESC code). Also causes a carriage return, if programmed to do so in SET-UP mode.
VT GP — — —	(11)D ; (0B)H	**Vertical Tabulation** Executes a single line feed.
VT — PRO FX JX	(11)D ; (0B)H	**Vertical Tabulation** Advances the paper to the next vertical tabulation stop (defined using ESC B or ESC b). If there is no vertical tabulation program, this code has the same function as LF.

FF GP PRO FX JX	(12)D ; (0C)H	**Form Feed** Advances the paper to the top of the next page (TOF: Top of Form). **If the ASF is mounted and selected, FF expels the sheet of paper from the printer** ***and feeds in a new sheet if the*** **command is received within a print field. If the paper is already in the BOF area, expulsion is automatic, and an FF command will cause a further paper expulsion operation.**
CR GP PRO FX JX	(13)D ; (0D)H	**Carriage Return** Returns the print position to the first column. Also causes a line feed, if programmed to do so in SET-UP mode.

MARGINS

ESC l n GP — FX JX	(27 108 n)D (1B 6C n)H	**Left Hand Margin** Parameter ''n'' indicates the column number in which the margin will be set: 10 cpi 0 ≤ n ≤ 78 12 cpi 0 ≤ n ≤ 93 17.1 cpi 0 ≤ n ≤ 133
ESC Q n — — FX JX	(27 81 n)D (1B 51 n)H	**Right Hand Margin** Parameter ''n'' indicates the column number in which the margin will be set: 10 cpi 2 ≤ n ≤ 80 12 cpi 3 ≤ n ≤ 96 17.1 cpi 4 ≤ n ≤ 137
ESC C n GP PRO FX JX	(27 67 n)D (1B 43 n)H 1 ≤ n ≤ 127	**Page Length (Lines)** Defines the page length in a number of print lines. The absolute value of the page length will vary if the line feed value is changed.
ESC C NUL n GP PRO FX JX	(27 67 0 n)D (1B 43 00 n)H 1 ≤ n ≤ 22	**Page Length (Inches)** Defines the page length in inches (1-22) The form feeds (FF) executed are related to this value. The form length can also be defined in SET-UP mode.

ESC N n GP PRO FX JX	(27 78 n)D (1B 4E n)H 1 ≤ n ≤ 127	**Bottom of Form** Defines an area at the foot of the page in which printing will NOT be possible (BOF = Bottom of Form). This area will be skipped automatically. **For this command to operate correctly, the paper must be set in Top of Form position. This command must be redefined if ESC C (page length) is modified.**
ESC O GP PRO FX JX	(27 79)D (1B 4F)H	**Clears BOF setting**
ESC 4 — PRO — —	(27 52)D (1B 34)H	**Top of Form** Sets the present position as the first print line on the form (TOF).

LINESPACING

ESC 0 GP PRO FX JX	(27 48)D (1B 30)H	**1/8 in line feed**
ESC 1 GP PRO FX JX	(27 49)D (1B 31)H	**7/72 in line feed**
ESC 2 GP PRO — —	(27 50)D (1B 32)H	**Executive command for ESC A** If not preceded by ESC A, sets a 1/6 in (4.23 mm) line feed.
ESC 2 — — FX JX	(27 50)D (1B 32)H	**1/6 in line feed**
ESC 3 n GP PRO FX JX	(27 51 n)D (1B 33 n)H 1 ≤ n ≤ 255	**n/216 in line feed**
ESC A n GP PRO FX JX	(27 65 n)D (1B 41 n)H 1 ≤ n ≤ 255	**n/72 in line feed**

The line feed value can also be defined in SET-UP mode.

PRINT PITCHES

ESC M GP — FX JX	(27 77)D (1B 4D)H	**12 cpi Pitch** Cleared by ESC P.
ESC P GP — FX JX	(27 80)D (1B 50)H	**10 cpi Pitch** Clears 12 cpi print pitch. Does not affect the character attributes (boldface, double width, condensed, etc.).
SI GP PRO FX JX	(15)D ; (0F)H	**17.1 cpi Pitch**
ESC SI — — FX JX	(27 15)D (1B 0F)	**Same function as SI.**
DC2 GP — FX JX	(18)D ; (12)H	**Clears 17.1 cpi Pitch**
ESC : — PRO — —	(27 58)D (1B 3A)H	**12 cpi Pitch**
DC2 — PRO — —	(18)D ; (12)H	**10 cpi Pitch** Clears 12 and 17.1 cpi print pitches.
ESC [n GP — — —	(27 91 n)D (1B 5B n)H	**Selects Print Pitch**

n	Pitch
0	10 cpi
1	12 cpi
2	15 cpi
3	17.1 cpi
4	20 cpi
5	24 cpi
6	30 cpi

ESC p n — — FX JX	(27 112 n)D (1B 70 n)H	**Proportional Pitch** n = 1: sets n = 0: clears. Ignored if H.S.D. printing has been selected in SET-UP mode.

TABULATION

ESC D $n_1..n_k$ NUL GP PRO FX JX	(27 68…0)D (1B 44…00)H $1 \le n_1..n_k \le 254$ $1 \le k \le 30$	**Horizontal Tabulation Program** Defines a horizontal tabulation program with a maximum of 30 stops. The values of parameters "n" must be sent in rising numerical order, and indicate the columns in which the stops will be set (left edge is column 0). At printer switch-on, the stops are set one every 8 characters. The sequence ESC D NUL clears all horizontal tabulation stops. Command code ESC R clears all horizontal tabulation stops, restoring the default values.
ESC B $n_1..n_k$ NUL — PRO FX JX	(27 66…0)D (1B 42…00)H $1 \le n_1..n_k \le 254$ $1 \le k \le 64$	**Vertical Tabulation Program** Defines a vertical tabulation program with a maximum of 64 stops. The values of parameter "n" must be sent in rising numerical order and indicate the lines at which the stops will be set (TOF = 1). At printer switch-on, there are no vertical tabulation stops. The sequence ESC B NUL and command code ESC R clear all vertical tabulation stops.
ESC R — PRO — —	(27 82)D (1B 52)H	**Clears All Tabulation Stops** Clears all horizontal tabulation stops set using ESC D (the default value one stop every eight characters is restored), and all vertical tabulation stops set using ESC B.

ESC b m **n_1…n_k NUL** — — FX JX	(27 98 m…0)D (1B 62 m…00)H $0 \le m \le 7$ $1 \le n \le 254$ $1 \le k \le 16$	**Multiple Vertical Tabulation Programs** Defines a series of vertical tabulation programs (maximum 8), each of which can contain a maximum of 16 tabulation stops. **The tabulation stops programmed using ESC b 0 are the same as those programmed using ESC B.**
ESC / m — — FX JX	(27 47 m)D (1B 2F m)H $0 \le m \le 7$	**Selects Vertical Tabulation Program** Implements the tabulation program containing the stops programmed using ESC b, according to the value of parameter ''m''.

CHARACTER ATTRIBUTES

ESC W n GP PRO FX JX	(27 87 n)D (1B 57 n)H	**Double Width** Sets/clears double width printing mode. The selected print pitch is doubled and the line capacity consequently halved. n = 1: sets n = 0: clears
SO GP PRO FX JX	(14)D ; (0E)H	**Sets Double Width** Operative ONLY within a line. Cleared by DC4, CR, LF and CAN.
ESC SO GP — FX JX	(27 14)D ; (1B 0E)H	**Same function as SO.**
DC4 GP PRO FX JX	(20)D ; (14)H	**Clears Double Width**
ESC G GP PRO FX JX	(27 71)D (1B 47)	**Sets Double-Strike**
ESC H GP PRO FX JX	(27 72)D (1B 48)D	**Clears Double Strike**
ESC E GP PRO FX JX	(27 69)D (1B 45)H	**Sets Boldface**
ESC F GP PRO FX JX	(27 70)D (1B 46)D	**Clears Boldface**
ESC - n GP PRO FX JX	(27 45 n)D (1B 2D n)H	**Underscored** n = 1: sets n = 0: clears

ESC S n GP PRO FX JX	(27 83 n)D (1B 53 n)H	**Superscripts/Subscripts** Sets the printing of reduced-sized and vertically displaced characters used in mathematical and scientific notation. The superscripts are printed half a line feed above the standard print line, the subscripts half a line feed below. n = 0: Superscripts n = 1: Subscripts
ESC T GP PRO FX JX	(27 84)D (1B 54)H	**Clears Superscripts/Subscripts**
ESC x n GP — — —	(27 120 n)D (1B 78 n)H	**Draft/NLQ** n = 0: sets H.S.D./Draft printing mode (depending on parameter selected in SET-UP mode). n = 1: sets NLQ printing mode.
ESC _ n — PRO — —	(27 95 n)D (1B 5F n)H	**Overscored** n = 1: sets n = 0: clears
ESC 4 — — FX JX	(27 52)D (1B 34)H	**Sets Italics** If H.S.D. print mode has been selected in SET-UP mode, this code will cause Draft italic printing as H.S.D. italics are not possible.
ESC 5 — — FX JX	(27 53)D (1B 35)H	**Clears Italics**

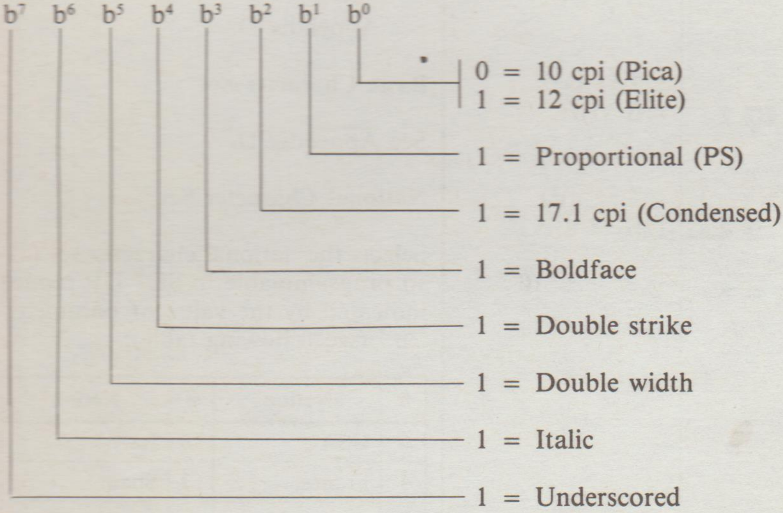
ESC ! n
— — FX JX

(27 33 n)D
(1B 21 n)H

$0 \leq n \leq 63$

Combined Attributes

Selects the character attribute combination according to the binary value of parameter "n":



Example: The binary value **00101000** (decimal 40) will give a character attribute combination of Double width + Boldface + 10 cpi. The command code for this combination will therefore be **ESC ! (40)D.**

Remember that the print pitches (10, 12 and 17.1 cpi) are mutually exclusive and that a boldface setting will reset 17.1 cpi to 10 cpi.

For this printer, bits 1, 6 and 7 (proportional, italics and underscored) are not significant.

ESC ! has priority over the other character attribute selection commands (ESC 4, ESC 5, etc.); n = 0 will clear any previous attribute setting.

CHARACTER SETS

ESC 6
GP PRO — —

(27 54)D
(1B 36)H

IBM table 2

See Appendix D.

ESC 7
GP PRO — —

(27 55)D
(1B 37)H

IBM table 1

See Appendix D.

ESC 7
— — FX JX

(27 55)D
(1B 37)H

Basic Character Set

See Appendix D.

ESC R n
— — FX JX

(27 82 n)D
(1B 52 n)H

$0 \leq n \leq 10$

National Character Set

Selects the national character set (also programmable in SET-UP mode) indicated by the value of parameter "n" (see following table):

n	Nation	n	Nation
0	USA	6	Italy
1	France	7	Spain
2	Germany	8	Japan
3	Great Britain	9	Norway
4	Denmark 1	10	Denmark 2
5	Sweden		

ESC \ n_1 n_2
— PRO — —

(27 92 n_1 n_2)D
(1B 5C n_1 n_2)H

Printing from Extended Character Set

Selects and prints of a number of characters from the extended character set table. Parameters n_1 and n_2 indicate the number of characters to be printed. They are calculated as follows:

n_2 = Integer (data items/256)
n_1 = Data items n_2 x 256

If the printer receives a code which has not been assigned to a character, it commands a forward character space (see extended character set table).

While this command code is operative, all the functions of the other command codes are suspended.

Once the characters indicated by parameters n1 and n2 have been printed, the printer resumes operating normally using the character set defined previously (ESC 6 or ESC 7); this command code is no longer effective and the functions of the other command codes are re-enabled.

---

				b8	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
				b7	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
b4	b3	b2	b1		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	0	0	0			SP	0	@	P	`	p	Ç	É	á	░	└	╨	α	≡
0	0	0	1	1			!	1	A	Q	a	q	ü	æ	í	▒	┴	╤	β	±
0	0	1	0	2			"	2	B	R	b	r	é	Æ	ó	▓	┬	╥	Γ	≥
0	0	1	1	3	♥		#	3	C	S	c	s	â	ô	ú	│	├	╙	π	≤
0	1	0	0	4	♦	¶	$	4	D	T	d	t	ä	ö	ñ	┤	─	╘	Σ	⌠
0	1	0	1	5	♣	§	%	5	E	U	e	u	à	ò	Ñ	╡	┼	╒	σ	⌡
0	1	1	0	6	♠		&	6	F	V	f	v	å	û	ª	╢	╞	╓	µ	÷
0	1	1	1	7			'	7	G	W	g	w	ç	ù	º	╖	╟	╫	τ	≈
1	0	0	0	8			(	8	H	X	h	x	ê	ÿ	¿	╕	╚	╪	Φ	°
1	0	0	1	9			)	9	I	Y	i	y	ë	Ö	⌐	╣	╔	┘	Θ	▪
1	0	1	0	A		→	*	:	J	Z	j	z	è	Ü	¬	║	╩	┌	Ω	—
1	0	1	1	B		←	+	;	K	[	k	{	ï	¢	½	╗	╦	█	δ	√
1	1	0	0	C			,	<	L	\	l	¦	î	£	¼	╝	╠	▄	∞	n
1	1	0	1	D			–	=	M	]	m	}	ì	¥	¡	╜	═	▌	φ	2
1	1	1	0	E			.	>	N	^	n	~	Ä	₧	«	╛	╬	▐	∈	■
1	1	1	1	F		Ø	/	?	O	_	o		Å	ƒ	»	┐	╧	▀	∩	SP

Extended IBM Proprinter Character Set Table

ESC ^
— PRO — —

(27 94)D
(1B 5E)H

Printing from Extended Character Set (1 Character)

Selects and prints of a single character code from the extended character set table. The character to be printed is usually a printer command code. For further details, see ESC \.

ESC I n
— — FX JX

(27 73 n)D
(1B 49 n)H

Selects/clears National Variants (0-31D/128-159D)

Allows printing of national character variants without changing the character set selected. The upright characters will be assigned codes 0 to 31D; the italic characters will have codes 128 to 159D.

n = 1: sets
n = 0: clears

DECIMAL CODE	CHAR.	DECIMAL CODE	CHAR.	DECIMAL CODE	CHAR.	DECIMAL CODE	CHAR.
0	à	22	∵	128	*à*	150	∵
1	è	23	Ä	129	*è*	151	*Ä*
2	ù	24	Ö	130	*ù*	152	*Ö*
3	ò	25	Ù	131	*ò*	153	*Ü*
4	ì	26	ä	132	*ì*	154	*ä*
5	°	28	ü	133	°	156	*ü*
6	£	29	É	134	£	157	*É*
16	§	30	é	144	§	158	*é*
17	ß	31	¥	145	*ß*	159	¥
21	ø			149	*ø*		

ESC 6
— — FX JX

(27 54)D
(1B 36)H

Special Italic Characters

Allows italic printing of special characters, using the codes from 128 to 159D and code 255. These codes are normally (Table 1) reserved for print command codes.

DECIMAL CODE	CHAR.
128	*à*
129	*è*
130	*ù*
131	*ò*
132	*ì*
133	°
134	£
135	*í*
136	*¿*

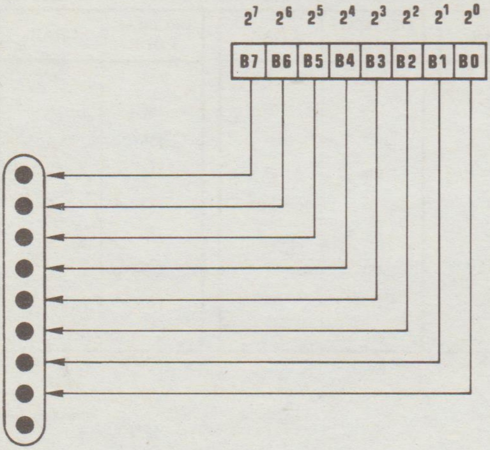
DECIMAL CODE	CHAR.
137	*Ñ*
136	*ñ*
139	¤
140	*₧*
141	*A*
142	*a*
143	*ç*
144	§

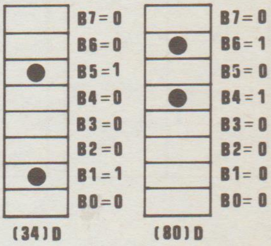
DECIMAL CODE	CHAR.
145	*ß*
146	*Æ*
147	*æ*
148	*Ø*
149	*ø*
150	¨.
151	*Ä*
152	*Ö*

DECIMAL CODE	CHAR.
153	*Ü*
154	*ä*
156	*ö*
156	*ü*
157	*É*
158	*é*
159	¥
255	0

GRAPHICS

The printer can operate in graphic printing mode using Bit Image Mode (BIM) logic. In Bit Image Mode, dots in an eight-dot high vertical format are printed. A dot is printed only if the corresponding bit in the byte received is at 1. For optimum print quality, the printer should be set to operate monodirectionally.





A printed line can contain both alphanumeric and BIM data.

ESC K n_1 n_2..
GP PRO FX JX

(27 75 n_1 n_2..)D
(1B 4C n_1 n_2..)H

Normal Density BIM Printing (60 dpi)

Sets normal density (60 dpi) BIM printing mode for a data string defined using parameters n_1 and n_2. Parameters n_1 and n_2 are calculated as follows:
n_2 = Integer (data items/256)
n_1 = BIM data items n_2 x 256
If n_1 and n_2 give a value which exceeds 480 (BIM print line capacity), the data in excess is ignored. If the print line also contains alphanumeric data, the amount of BIM data which can be printed decreases according to the values indicated in the following table:

Denomination	Pitch	BIM Data Lost per character printed
Pica	10 cpi	6
Elite	12 cpi	5
Condensed	17.1 cpi	3.5
Pica enlarged	5 cpi	12
Condensed enlarged	8.5 cpi	7
Elite enlarged	6 cpi	10

ESC L n_1 n_2 GP PRO FX JX	(27 76 n_1 n_2..)D (1B 4D n_1 n_2..)H	**Double Density, Half-Speed BIM Printing (120 dpi)** Sets double density (120 dpi) BIM printing mode for a data string defined using parameters n_1 and n_2. The line capacity is 960. For further details, see ESC K.
ESC Y n_1 n_2.. GP PRO FX JX	(27 89 n_1 n_2..)D (1B 59 n_1 n_2..)H	**Double Density, Normal Speed BIM Printing (120 dpi)** The line capacity is 960, but adjacent dots are not printed. For further details, see ESC K.
ESC Z n_1 n_2.. GP PRO FX JX	(27 90 n_1 n_2..)D (1B 60 n_1 n_2..)H	**Quadruple Density BIM Printing (240 dpi)** Sets quadruple density (240 dpi) BIM printing mode for a data string defined using parameters n_1 and n_2. The line capacity is 1920, but adjacent dots are not printed. For further details, see ESC K.

ESC * m
n_1 n_2...
GP — FX JX

(27 42 m n_1n_2..)D
(1B 2A m n_1n_2..)H

$0 \le m \le 6$

Immediate BIM Selection

Selects BIM printing with the density and speed combination indicated by the value of parameter ''m'' in the following table:

m	MODE	dpi	dpl
0	Normal density	60	480
1	Double density, half speed	120	960
2	Double density, normal speed	120	960
3	Quadruple density	240	1.920
4	Graphics display I	80	640
5	Graphic plotter (x:y = 1:1)	72	576
6	Graphics display II	90	720

For further details, see ESC K.

ESC ? n m
— — FX JX

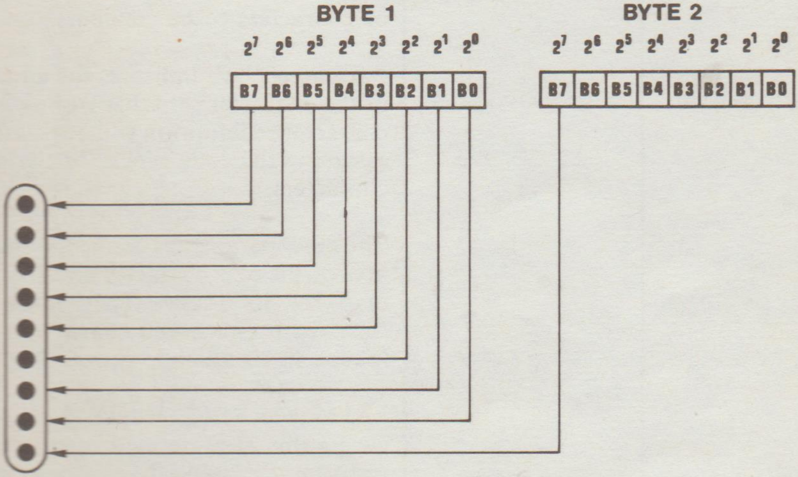
(27 63 n m)D
(1B 3F n m)H

n = K, L, Y or Z
$0 \le m \le 6$

Redefines BIM Command

Using parameter ''m'' it is possible to assign one of the values in the previous table to one of the standard BIM command codes (ESC K, L, Y or Z).

ESC ^ m **n_1 n_2..** — — FX JX	(27 94 m n_1n_2..)D (1B 5E m n_1n_2..)H	**9-Dot BIM Printing** Sets BIM printing (with normal or double density) in 9-dot high horizontal strings, defined in 2 bytes. m = 0: 60 dpi m = 1: 120 dpi. n_1 and n_2: see ESC K, to define string length. For each line of data, two bytes must be transmitted. The first byte controls the first 8 dots (as in normal BIM mode). The second byte controls the 9th dot (see the following figure).



DOWN-LINE LOADING (DLL) OF USER-DEFINED CHARACTER SET (PROPRINTER)

If you wish, you can create your own character set, and use it instead of the standard set. You can create up to 94 characters, and load them into the printer memory (DLL : Down-Line Loading) using command code ESC =.

The new character set table will be loaded in the printer RAM. Bear in mind that the RAM contents, and therefore any personalised character codes, are lost when the printer is switched off.

ESC = **n_1 n_2 DC4 m** **a_1 b_1 NUL** **$p_1..p_{10}$ ...** **a_k b_k NUL** **$pk_1..pk_{10}$**	(27 61 n_1 n_2..)D (1B 3D n_1 n_2..)D $1 < k < 94$	**User-Defined Characters** Creates a series of personalised characters, and loads them in the printer RAM. Parameters n_1 and n_2 define number of characters to be created. Parameter ''m'' indicates the address in the character set table from which character redefinition will begin, thus assigning the code range for the new characters. The other parameters define the attributes of the new character and the dot map for its shape. They must be repeated for each new character, and loaded in rising code order. The sequence ESC = NUL NUL will clear any user-defined characters, restoring the standard character set.

Parameters n_1 and n_2

These two parameters indicate the number of character codes (data items) to be redefined. They are calculated as follows:

(number of character codes to be redefined x 13) + 2 = t

If t is less than 256, then $n_1 = t$ and $n_2 = 0$.

If t is greater than 265, then n_1 = remainder of operation t/256 and n_2 = quotient of the same operation.

Example:

81 character codes are to be redefined:

$t = (81 \times 13) + 2 = 1055$

1055/256 = 4 (quotient) and 31 (remainder)

$n_1 = 31$, $n_2 = 4$.

Parameter m

This parameter (range 33D 126D) indicates the address in the character set table from which character redefinition will begin.

Example:

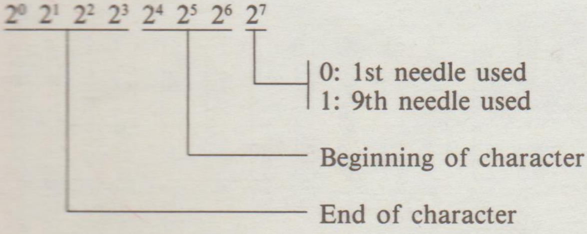
If characters A to E (65 to 69D) are to be redefined:

m = A; $n_1 = 4$ and $n_2 = 0$

Parameter a_k

This byte defines the attributes which can be assigned to the new character. It indicates the use of the 1st or 9th needle and the character dimension (if a proportional character is to be created).

The following diagram shows the correspondence between the bits and the character attributes:

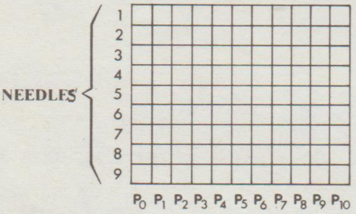


Bits 0 to 6 are ignored if the character spacing is fixed.

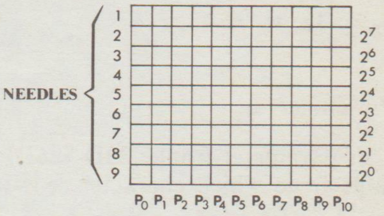
Parameters p_{k1} … p_{k10}

These eleven bytes contain the dots per column which make up the shape of the user-defined character. As in BIM printing mode, each bit in the various bytes is associated with a print needle, and its binary value (1 or 0) indicates whether or not a dot will be printed.

An 8 x 11 usable matrix is available for the creation of each user-defined character:

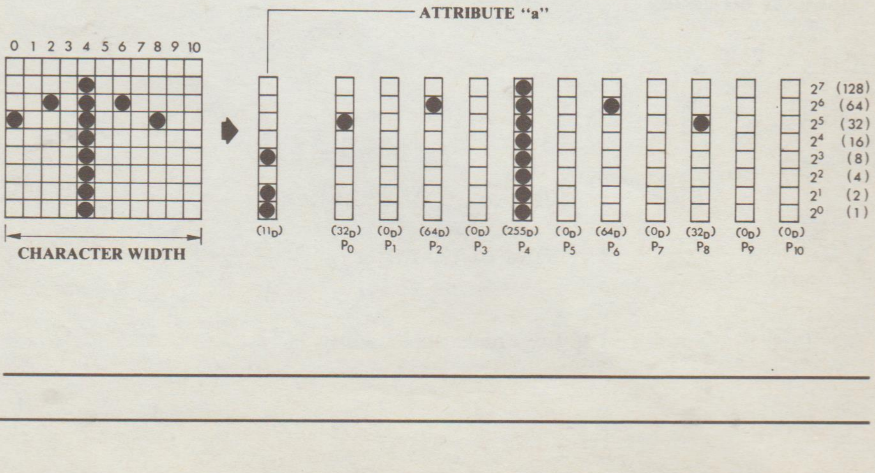

NEEDLES
1
2
3
4
5
6
7
8
9
2^7
2^6
2^5
2^4
2^3
2^2
2^1
2^0
P_0 P_1 P_2 P_3 P_4 P_5 P_6 P_7 P_8 P_9 P_{10}

NINTH NEEDLE NOT USED
(FIRST NEEDLE USED)


NEEDLES
1
2
3
4
5
6
7
8
9
2^7
2^6
2^5
2^4
2^3
2^2
2^1
2^0
P_0 P_1 P_2 P_3 P_4 P_5 P_6 P_7 P_8 P_9 P_{10}

NINTH NEEDLE USED
(FIRST NEEDLE NOT USED)

Bear in mind that, to guarantee print needle recycle, a needle used in the nth column cannot be used in column n + 1. If this limit is not observed, the matrix configuration will be corrected automatically by the printer. In this case, the character printed will differ from the configuration transmitted.



ESC I n	(27 73 n)D (1B 49 n)H	**Printable Character Set** Selects the character set to be used for printing, according to the value of to the value of parameter ‘‘n’’: n = 0: standard character set in H.S.D./Draft mode (depending on parameter selected in SET-UP mode) n = 2: standard character set in NLQ mode n = 4: DLL character set in Draft mode (if H.S.D. is selected in SET-UP, this selection will be overridden, with reversion to Draft printing mode) n = 6: DLL character set in NLQ mode.

DOWN-LINE LOADING (DLL) OF USER-DEFINED CHARACTER SET (EPSON)

If you wish, you can define your own character set, and use it instead of the standard set. Usually, codes 0 to 31D (printer control codes) cannot be redefined. It is possible to redefine just a few characters, keeping the rest standard. The new character set table will be loaded in the printer RAM. Bear in mind that the RAM contents, and therefore any personalised character codes, are lost when the printer is switched off.

ESC & NUL **n_1 n_2** **a $p_0 \ldots p_{10}$** **(a $p_0 .. p_{10}$)k**	$(27\ 38\ 0\ n_1 n_2 ..)D$ $(1B\ 26\ 00\ n_1 n_2 ..)H$ $1 \leq k \leq 255$	**User-Defined Characters** Defines a series of personalised characters, and loads them in the printer RAM. Parameters n_1 and n_2 define the beginning and end of the user-defined character field, indicating the codes assigned to the new characters. The other parameters define the attributes of each new character and the dot map for its shape.

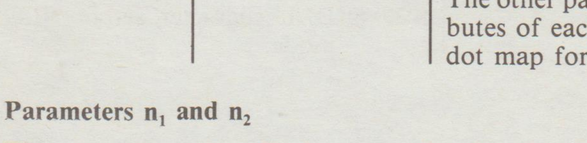
Parameters n_1 and n_2

These two parameters fix the range of codes whose characters are to be redefined. If $n_1 = n_2$, only one new character will be created.

Example: If the field A to E is to be redefined (65 to 69D), then n_1 = A and n_2 = E.

Parameter a_k

This byte defines the attributes which can be assigned to the new character. It indicates the use of the 1st or 9th needle, and fixed or proportional spacing. The following diagram shows the correspondence between the bits and the character attributes:



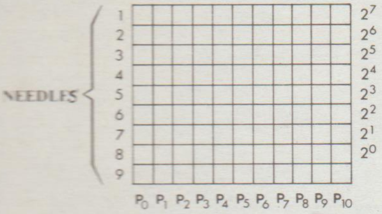
Only the value of the MSB (2^7) must be considered when using fixed spacing.

When using proportional spacing, the values of the other seven bits must also be considered for the definition of the beginning and end of the character.

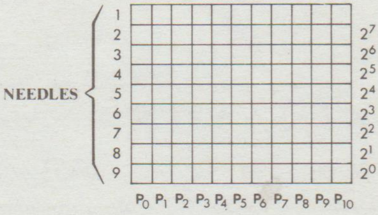
Parameters p_0 .. p_{10}

Each parameter "p_i" is a byte which contains the dots to be printed in column "i" of the character matrix. As in BIM, each bit in the byte is associated with a print needle. If the bit is at 1, a dot will be printed.

An 8 x 11 usable matrix is available for the creation of each user-defined character:



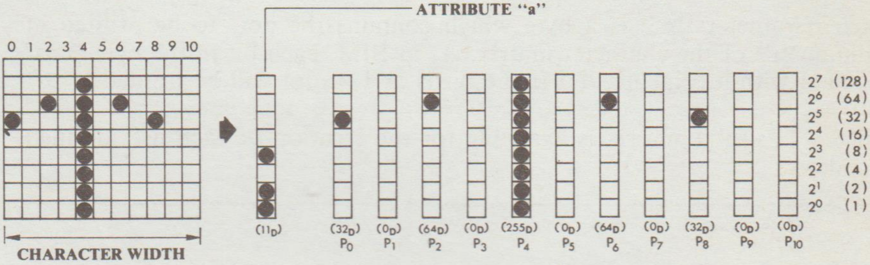
NINTH NEEDLE NOT USED
(FIRST NEEDLE USED)



NINTH NEEDLE USED
(FIRST NEEDLE NOT USED)

Examples

1) User-defined character (A) with **Fixed Spacing**



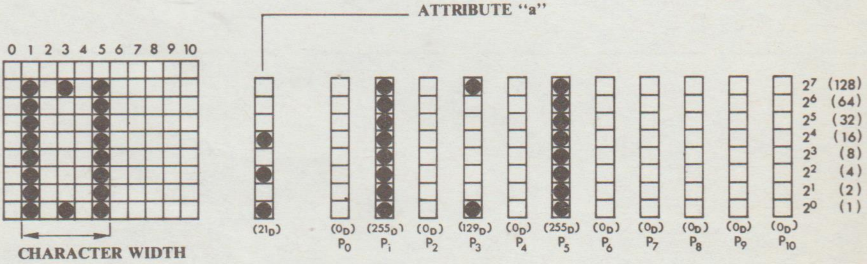
Command to be sent

ESC & NUL A A VT SP.......NUL

(1B 26 00 41 41 0B 20.......00)H

---

2) User-defined character (B) with **Proportional Spacing**



Command to be sent

ESC & NUL B B NAK NUL.......NUL

(1B 26 00 42 42 15 00........00)H

ESC % n NUL	(27 37 n 0)D (1B 25 n 00)H	**Selects Standard/DLL Characters** n = 1 : Selects DLL character set, loaded in RAM using ESC &. n = 0 : Resumes use of standard character set (ROM).
ESC : NUL NUL NUL	(27 58 0 0 0)D (1B 3A 00 00 00)H	**Copies ROM into RAM** Copies the contents of the ROM character generator (standard characters) into RAM.

DATA CONTROL

CAN GP PRO FX JX	(24)D ; (18)H	**Buffer Reset** Clears the print buffer contents; all the data is lost. Also clears double width attribute set with SO or ESC SO.
DC1 — PRO FX JX	(17)D ; (11)H	**Activates Printer-Host Connection**
DC3 — PRO FX JX	(19)D ; (13)H	**Disactivates Printer-Host Connection**
ESC Q ETX — PRO — —	(27 81 3)D (1B 51 03)H	**Disactivates Printer-Host Connection**
ESC 5 n — PRO — —	(27 53 n)D (1B 35 n)H	**Automatic Line Feed** n = 1: automatic LF after CR if set (CR = CR + LF). n = 0: no automatic LF after CR (CR = CR). This command will clear the inverse parameter value defined in SET-UP.
ESC @ — — FX JX	(27 64)D (1B 40)H	**General Reset** Re-initialises the printer, resetting it to switch-on condition.

DEL — — FX JX	(127)D ; (FF)H	**Delete** Clears last printable character from the print buffer.
ESC = — — FX JX	(27 61)D (1B 3D)H	**MSB Forced to 0** Used in 7-bit transmission. The printer ignores the 8th bit 2^7 (MSB - Most Significant Bit). The character code table is limited to (0 - 127)D.
ESC > — — FX JX	(27 62)D (1B 3E)H	**MSB Forced to 1** Used in 7-bit transmission. The printer ignores the 8th bit 2^7 (MSB - Most Significant Bit). The character code table is limited to (128 - 255)D.
ESC # — — FX JX	(27 35)D (1B 23)H	**Clears Forcing of MSB** Clears the forcing of the most significant bit (MSB) to allow 7-bit transmission.

COLOUR PRINTING

For following command codes to be operative on the printer with the colour feature, the appropriate setting must have been made in SET-UP mode (TYPE OF RIBBON = COLOURED). A colour ribbon cartridge must also have been inserted in the printer.

ESC b	(27 98)D	**Black**
GP PRO — —	(1B 62)H	
ESC m	(27 109)D	**Magenta**
GP PRO — —	(1B 6D)H	
ESC c	(27 99)D	**Cyan**
GP PRO — —	(1B 63)H	
ESC y	(27 121)D	**Yellow**
GP PRO — —	(1B 79)H	

Further colours can be created by overprinting the line with a different colour:

- **green, overprinting cyan on yellow**
- **orange, overprinting magenta on yellow.**
- **violet, overprinting cyan on magenta.**

ESC r n	(27 114 n)D	**Colour selection**
GP PRO — JX	(1B 72 n)H	Selects colour printing according to value of parameter "n":
	0 ≤ n ≤ 6	

n	Colour
0	BLACK
1	MAGENTA
2	BLUE
3	VIOLET
4	YELLOW
5	ORANGE
6	GREEN

Further colours can be created by overprinting the line with a different colour.

When creating composite colours, ALWAYS print the line in yellow first, to avoid staining the yellow ribbon with the darker colours.

OTHERS

ESC J n GP PRO FX JX	(27 74 n)D (1B 4A n)H 1 ≤ n ≤ 255	**n/216 in Line Feed Forward** Commands printing and advances the paper n/216 in.
ESC 8 GP — FX JX	(27 56)D (1B 38)H	**End of Form Signal Disabled** Printing will continue to the last line of the form.
ESC 9 GP — FX JX	(27 57)D (1B 39)H	**End of Form Signal Enabled** Printing will stop at the beginning of the bottom of form area, and an acoustic signal will be given.
ESC U n — PRO FX JX	(27 85 n)D (1B 55 n)H	**Mono/Bidirectional Printing** n = 1: monodirectional n = 0: bidirectional. Monodirectional printing gives better printing quality and character alignment. In GP environment, this command is recognised but is not executive, as monodirectional printing will be executed automatically whenever improved character alignment is deemed necessary.

ESC j n — — FX JX	(27 106 n)D (1B 6A n)H 1 ≤ n ≤ 255	**n/216 in Reverse Line Feed** Executes an n/216 in reverse line feed. **Not executed if an ''end of page'' signal is received. Inoperative if the sprocket or ASF is mounted and in use.**
ESC < — — FX JX	(27 60)D (1B 3C)H	**Monodirectional Printing** Sets the printer to operate monodirectionally (left to right) for one line.
ESC i n — — FX JX	(27 105 n)D (1B 69 n)H	**Immediate Character Printing** n = 1: sets n = 0: clears **ESC i 1 cannot be used if the sprocket or ASF is mounted.**
ESC s n — — FX JX	(27 115 n)D (1B 73 n)H	**Reduced/Normal Printing Speed** n = 1: reduced speed n = 0: normal speed Reduced printing speed makes the printer operation quieter.
ESC EM n — — FX JX	(27 25 n)D (1B 19 n)H	**ASF Enabled/Disabled** n = 1: enabled n = 0: disabled.

A. TECHNICAL CHARACTERISTICS

PRINTING TECHNIQUE	Impact dot matrix (9-needle print head).
PRINT MODE	**H.S.D.** – matrix: 9 x (4+3) dots – print speed: 200 cps, at 10 cpi **Draft** – matrix: 9 x (5+4) dots – print speed: 150 cps, at 10 cpi **N.L.Q.** – matrix: 18 x 9 dots – print speed: 30 cps at 10 cpi
TABULATION SPEED	220 cps
PRINTING DIRECTION	bi-directional, with optimised head movement
PRINT PITCHES	10,12,15,17.1,20,24,30 cpi programmable from line or in SET-UP mode
LINE FEED	– 1/6 in (4.23 mm), 1/8 in (3.17 mm) and 7/72 in (2.4 mm) – n/216 in and n/72 in
CHARACTER SET	ASCII characters and special characters. (see tables in Appendix D)
PRINT LINE CAPACITY	80 to 240 characters, according to print pitch selected
PRINTING STYLES	See Appendix C for the printing styles available.

▶

PAPER FEED SPEED	42.3 mm/s
LINE FEED SPEED	100 ms
PAPER HANDLING	See Chapter 3
INKED RIBBON	**Standard printer** Manufacturer-original "SMALL CART" cartridges, black fabric with re-inker; Average life: 800,000 characters **Printer with colour feature** Four-colour cartridges; Average life: 500,000 characters for black; 300,000 for each of the other colours Four-track black cartridges; Average life: 3,200,000 characters
GRAPHIC PRINTING (BIM Mode)	– **8 vertical dots** – vertical resolution: 72 dots/in – horizontal resolution: 60 to 240 dot/in, programmable from line (see Chapter 7)
INTERFACE	Parallel (Centronics-like)
OPERATING ENVIRONMENT	Temperature: 10 C to 40 C Relative humidity: 15% to 95% (without condensation)
ELECTRICAL CHARACTERISTICS	110, 115, 120 V; ±10%; 50 - 60 Hz 220, 240 V; ±10%; 50 60 Hz Power absorption: 35 W
PHYSICAL CHARACTERISTICS	**Standard printer** Height: 2.5 in (74 mm) Width: 13.6 in (346 mm) Depth: 9.96 in (253 mm) Weight: 8.8 lb (4 kg) **Printer with colour feature** Height: 3.7 in (94 mm) Width: 14.6 in (370 mm) Depth: 9.96 in (253 mm) Weight: 9.2 lb (4.2 kg)

B. PARALLEL INTERFACE

To connect the printer to the host computer, this must be equipped with a Centronics-like parallel interface.

Printer to computer signals and vice versa pass through the wires of the interface. Logic 1 is considered as a voltage level between 3 and 5 V (5.5 V max. peak) while logic 0 is considered a voltage between 0 and 0.7 V (min. peak -0.5 V).

The printer has a 7K byte (5.5K for printer with colour feature) print buffer.

The following signals, generated by the computer, are present on the output connector of the interface:

- DATA STROBE (pin 1)
- DATA LINES (pins 2 to 9)
- INPUT PRIME (pin 31)

while the following are generated by the printer:

- ACKNOWLEDGE (pin 10)
- BUSY (pin 11)
- PAPER EMPTY (pin 12)
- SELECT (pin 13)
- FAULT (pin 32).

Signal Description

The DATA STROBE signal is a negative pulse used to store data in the printer. The pulse duration must be greater than 800 ns. The circuit is closed with a resistance towards the + 5V wire.

The eight DATA LINES circuits transmit the bytes (characters or command codes) from the computer to the printer and are closed with a resistance towards the +5 V wire.

The INPUT PRIME signal (negative pulse) re-initialises the printer. The pulse duration must exceed 10 ms.

The ACKNOWLEDGE signal (negative pulse) informs the computer of completed transfer of each character to the printer. The printer is ready to receive the next character.

The BUSY signal (when high) indicates that the printer cannot accept any characters.

The PAPER EMPTY signal (when high) informs the computer that the paper supply is almost finished.

The SELECT signal (when high) indicates that the printer can receive data.

The FAULT signal (when low) indicates a printer fault condition.

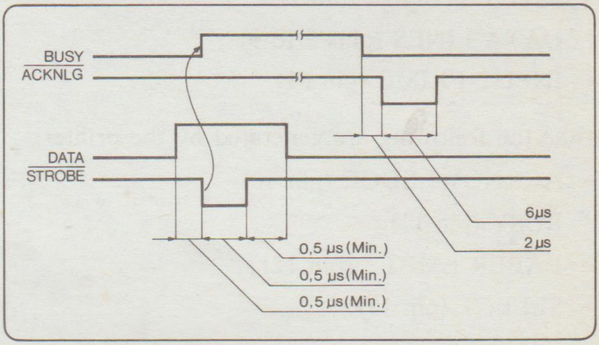


*Fig. B-1
Data Exchange
Sequence and
Timing*

C. PRINTING STYLE COMBINATIONS AND EXAMPLES

The printer can operate in the following **modes:**

- H.S.D. (High Speed Draft)
- DRAFT
- N.L.Q. (Near Letter Quality),

using the following **print pitches:**

- Pica 10 cpi
- Elite 12 cpi
- Micro 15 cpi
- Condensed 17.1 cpi
- Pica compressed 20 cpi
- Elite compressed 24 cpi
- Micro compressed 30 cpi

and the following **styles:**

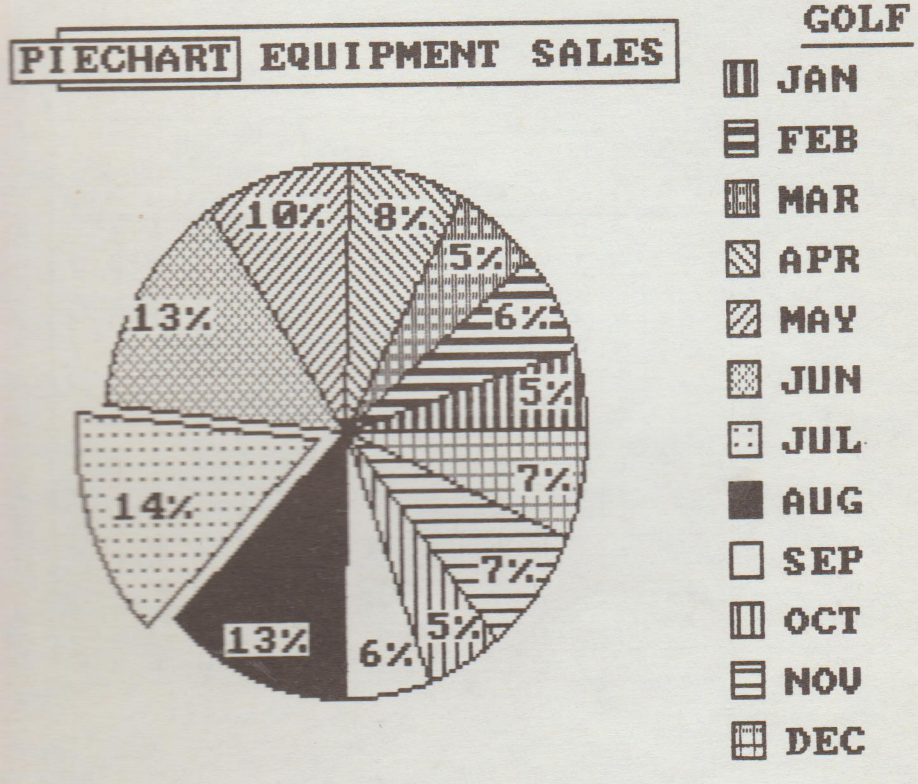
- boldface
- double width
- superscript
- subscript
- double strike
- underscored.

The following table illustrates shows the various printing style combinations in 12 cpi print pitch. This printing style combination table can be repeated all the programmable pitches.

Possible Combinations									Examples of Printing
n	N	Q	Em	En	Sp	Sb	DS	Un	
1	•								** Dot Matrix **
2	•							•	** Dot Matrix **
3	•						•		** Dot Matrix **
4	•						•	•	** Dot Matrix **
5	•					•			** Dot Matrix **
6	•					•		•	** Dot Matrix **
7	•				•				** Dot Matrix **
8	•				•			•	** Dot Matrix **
9	•			•					** Dot Matrix **
10	•			•				•	** Dot Matrix **
11	•			•			•	•	** Dot Matrix **
12	•			•			•	•	** Dot Matrix **
13	•			•		•			** Dot Matrix **
14	•			•		•		•	** Dot Matrix **
15	•			•	•				** Dot Matrix **
16	•			•	•			•	** Dot Matrix **
17	•		•						** Dot Matrix **
18	•		•					•	** Dot Matrix **
19	•		•				•		** Dot Matrix **
20	•		•				•	•	** Dot Matrix **
21	•		•			•			** Dot Matrix **
22	•		•			•		•	** Dot Matrix **
23	•		•		•				** Dot Matrix **
24	•		•		•			•	** Dot Matrix **
25	•		•	•					** Dot Matrix **
26	•		•	•				•	** Dot Matrix **
27	•		•	•			•		** Dot Matrix **
28	•		•	•			•	•	** Dot Matrix **
29	•		•	•		•			** Dot Matrix **
30	•		•	•		•		•	** Dot Matrix **
31	•		•	•	•				** Dot Matrix **
32	•		•	•	•			•	** Dot Matrix **
33		•							** Dot Matrix **
34		•						•	** Dot Matrix **
35		•		•					** Dot Matrix **
36		•		•				•	** Dot Matrix **
37		•	•						** Dot Matrix **
38		•	•					•	** Dot Matrix **
39		•	•	•					** Dot Matrix **
40		•	•	•				•	** Dot Matrix **

N = Draft/H.S.D.
Q = Near Letter Quality
Em = Boldface
En = Double width

Sp = Superscript
Sb = Subscript
Ds = Double Strike
Un = Underscored


PIECHART
EQUIPMENT SALES
GOLF
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
10%
8%
5%
6%
5%
7%
7%
5%
6%
13%
14%
13%

D. CHARACTER CODE TABLES

IBM Environment

				b8	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
				b7	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
b4	b3	b2	b1		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
0	0	0	0	00	NUL		SP	0	@	P	`	p	NUL		á	░	└	╨	α	≡
0	0	0	1	01			!	1	A	Q	a	q			í	▒	┴	╤	β	±
0	0	1	0	02		DC2	"	2	B	R	b	r		DC2	ó	▓	┬	╥	Γ	≥
0	0	1	1	03			#	3	C	S	c	s			ú	│	├	╙	π	≤
0	1	0	0	04		DC4	$	4	D	T	d	t		DC4	ñ	┤	─	╘	Σ	⌠
0	1	0	1	05			%	5	E	U	e	u			Ñ	╡	┼	╒	σ	⌡
0	1	1	0	06			&	6	F	V	f	v			ª	╢	╞	╓	µ	÷
0	1	1	1	07			'	7	G	W	g	w			º	╖	╟	╫	τ	≈
1	0	0	0	08	BS	CAN	(	8	H	X	h	x	BS	CAN	¿	╕	╚	╪	Φ	°
1	0	0	1	09	HT		)	9	I	Y	i	y	HT		⌐	╣	╔	┘	Θ	■
1	0	1	0	10	LF		*	:	J	Z	j	z	LF		¬	║	╩	┌	Ω	-
1	0	1	1	11	VT	ESC	+	;	K	[	k	{	VT	ESC	½	╗	╦	█	δ	√
1	1	0	0	12	FF		,	<	L	\	l	¦	FF		¼	╝	╠	▄	∞	∩
1	1	0	1	13	CR		–	=	M	]	m	}	CR		¡	╜	═	▌	ø	2
1	1	1	0	14	SO		.	>	N	^	n	~	SO		«	╛	╬	▐	∈	■
1	1	1	1	15	SI		/	?	O	_	o		SI		»	┐	╧	▀	∩	SP

International 1 (selected with ESC 7)

b4b3b2b1		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
b8		0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
b7		0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
b6		0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
b5		0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
0000	00	NUL		SP	0	@	P	`	p	NUL		á	░	└	┴	ɑ	≡
0001	01			!	1	A	Q	a	q			í	▒	┴	┬	β	±
0010	02		DC2	"	2	B	R	b	r		DC2	ó	▓	┬	╥	Γ	≥
0011	03			#	3	C	S	c	s			ú	│	├	╙	π	≤
0100	04		DC4	$	4	D	T	d	t		DC4	ñ	┤	─	╘	Σ	⌠
0101	05			%	5	E	U	e	u			Ñ	╡	┼	╒	σ	⌡
0110	06			&	6	F	V	f	v			ª	╢	╞	╓	µ	÷
0111	07			'	7	G	W	g	w			º	╖	╟	╫	τ	≈
1000	08	BS	CAN	(	8	H	X	h	x	BS	CAN	¿	╕	╚	╪	Φ	°
1001	09	HT		)	9	I	Y	i	y	HT		⌐	╣	╔	┘	Θ	■
1010	10	LF		*	:	J	Z	j	z	LF		¬	║	╩	┌	Ω	-
1011	11	VT	ESC	+	;	K	[	k	{	VT	ESC	½	╗	╦	█	δ	√
1100	12	FF		,	<	L	\	l	¦	FF		¼	╝	╠	▄	∞	∩
1101	13	CR		–	=	M	]	m	}	CR		¡	╜	═	▌	ø	2
1110	14	SO		.	>	N	^	n	~	SO		«	╛	╬	▐	∈	■
1111	15	SI		/	?	O	_	o		SI		»	┐	╧	▀	∩	SP

International 2 (selected with ESC 6)

	INTERNATION. 2		ISRAEL		GREECE					SPAIN			PORTUGAL			DENMARK 2				TURKEY		
	9	A	8	9	8	9	A	E	F	8	9	A	8	9	A	5	7	9	A	8	9	A
0	É	á	א	נ	Α	Ρ	ι	ω	Ώ	Ç	É	á	Ç	É	á	P	p	É	á	Ç	É	á
1	æ	í	ב	ס	Β	Σ	κ	ά	±	ü	Í	í	ü	À	í	Q	q	æ	í	ü	æ	í
2	Æ	ó	ג	ע	Γ	Τ	λ	έ	≥	é	Ó	ó	é	È	ó	R	r	Æ	ó	é	Æ	ó
3	ô	ú	ד	ף	Δ	Υ	μ	ή	≤	â	ô	ú	â	ô	ú	S	s	ô	ú	â	ô	ú
4	ö	ñ	ה	פ	Ε	Φ	ν	ϊ	⌠	ä	ö	ñ	ã	õ	ñ	T	t	ö	ñ	ä	ö	ñ
5	ò	Ñ	ו	ץ	Ζ	Χ	ξ	ί	⌡	à	ò	Ñ	à	ò	Ñ	U	u	ò	Ñ	à	ò	Ñ
6	û	õ	ז	צ	Η	Ψ	ο	ό	÷	À	û	ª	Á	Ú	ª	V	v	û	õ	å	û	Ğ
7	ù	Õ	ח	ק	Θ	Ω	π	Ú	≈	ç	ù	º	ç	ù	º	W	w	ù	Õ	ç	ù	ğ
8	ÿ	¿	ט	ר	Ι	α	ρ	Ü	°	ê	Á	¿	ê	Ì	¿	X	x	ÿ	¿	ê	İ	¿
9	Ö	ã	י	ש	Κ	β	σ	ώ	£	ë	Ö	ŀ	Ê	Õ	Ò	Y	y	Ö	ã	ë	Ö	⌐
A	Ü	Ã	ך	ת	Λ	γ	ς	Ά	-	è	Ü	Ŀ	è	Ü	¬	Z	z	Ü	Ã	è	Ü	¬
B	ø	ℓ	כ	¢	Μ	δ	τ	Έ	√	ï	Ò	½	Í	¢	½	Æ	æ	¢	ℓ	ï	¢	½
C	£	’n	ל	©	Ν	ε	υ	Ή	∩	î	£	¼	Ô	£	¼	Ø	ø	£	’n	î	£	¼
D	Ø	¡	ם	¥	Ξ	ζ	φ	Ί	2	ì	Ú	¡	ì	Ù	¡	Å	å	Ø	¡	ı	¥	¡
E	Ŀ	3	מ	Pt	Ο	η	χ	Ό	■	Ä	Pt	«	Ã	Pt	«	^	~	Ŀ	3	Ä	Ş	«
F	Γ	¤	ן	ƒ	Π	θ	ψ	Ύ	SP	È	Ï	»	Â	Ó	»	_		ŀ	¤	Â	ş	»

NOTE: There are two alternatives (different ROM): TURKEY or DENMARK-2 and INTERNATIONAL 2

				b8	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
				b7	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
b4	b3	b2	b1		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	0	0	0			SP	0	@	P	`	p			SP	0	@	P	`	p
0	0	0	1	1		DC$_1$	!	1	A	Q	a	q		DC$_1$	!	1	A	Q	a	q
0	0	1	0	2		DC$_2$	”	2	B	R	b	r		DC$_2$	”	2	B	R	b	r
0	0	1	1	3		DC$_3$	#	3	C	S	c	s		DC$_3$	#	3	C	S	c	s
0	1	0	0	4		DC$_4$	$	4	D	T	d	t		DC$_4$	$	4	D	T	d	t
0	1	0	1	5			%	5	E	U	e	u			%	5	E	U	e	u
0	1	1	0	6			&	6	F	V	f	v			&	6	F	V	f	v
0	1	1	1	7	BEL		’	7	G	W	g	w	BEL		’	7	G	W	g	w
1	0	0	0	8	BS	CAN	(	8	H	X	h	x	BS	CAN	(	8	H	X	h	x
1	0	0	1	9	HT		)	9	I	Y	i	y	HT		)	9	I	Y	i	y
1	0	1	0	A	LF		*	:	J	Z	j	z	LF		*	:	J	Z	j	z
1	0	1	1	B	VT	ESC	+	;	K	[	k	{	VT	ESC	+	;	K	[	k	{
1	1	0	0	C	FF		,	<	L	/	l	¦	FF		,	<	L	\	l	¦
1	1	0	1	D	CR		–	=	M	]	m	}	CR		–	=	M	]	m	}
1	1	1	0	E	SO		.	>	N	^	n	~	SO		.	>	N	^	n	~
1	1	1	1	F	SI		/	?	O	—	o	DEL	SI		/	?	O	—	o	DEL

☐ NATIONAL VARIANTS

Basic Character Set (selected with ESC 7)

NATIONAL VARIANTS:

NATIONS	HEX. CODE											
	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
U.S.A.	#	$	@	[	\	]	¨	`	{	¦	}	˜
FRANCE	#	$	à	°	ç	§	^	`	é	ù	è	¨
GERMANY	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
G. BRITAIN	£	$	@	[	\	]	^	`	{	¦	}	˜
DENMARK	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	˜
SWEDEN	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
ITALY	#	$	@	°	\	é	^	ù	à	ò	è	ì
SPAIN	Pt	$	@	¡	Ñ	¿	^	`	¨	ñ	}	˜
JAPAN	#	$	@	[	¥	]	^	`	{	¦	}	˜

National Variants (selected with ESC R)

E. TROUBLESHOOTING GUIDE

Operator intervention is limited to certain easily identifiable symptoms and remedies.

If a printer malfunction other than those indicated below occurs, contact the Technical Assistance Service or the dealer from whom the printer was purchased.

Symptom	Possible cause	Action
Does not print. ON light is OFF.	No power	Insert the plug correctly into a functioning socket and switch the printer ON.
Does not print. FAILURE LED flashes	Error during autodiagnostic routine	Switch the printer OFF. Check that the print head carriage is free to move and that there are no foreign bodies in the printer. Turn the paper feed knob and switch the printer ON again. If the error persists, contact the Technical Assistance Service.
Does not print. FAILURE LED lit and steady	Fault	Switch the printer OFF and call the Technical Assistance Service.
Printing does not begin at the TOF (sprocket)	Incorrect form length setting	Modify the form length setting (see Chapter 5-SET-UP mode).
	Incorrect form positioning	Press the FORM FEED Key and reposition the form on the first print line.
Paper advances slanted or tears	Incorrect positioning of paper release lever	Check correct position of lever.
Faded printing	Ribbon needs replacing or is positioned incorrectly	Replace ribbon cartridge, making sure it is positioned correctly.